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KENTUCKY ECONOMY
Review & Perspective

THE KENTUCKY COUNCIL OF ECONOMIC ADVISORS
University of Kentucky, Lexington, Kentucky 40506

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The Governor Looks to the Future

I would like to take this opportunity to commend the Kentucky Council of Economic Advisors and their publication the *Kentucky Economy: Review & Perspective* for their efforts to expand the appreciation as well as the understanding of economics. During these uncertain times a strong and resilient economy is vital to our democratic way of life. Therefore, an increased understanding of economic and business issues is more necessary than ever if we are to develop a new climate for economic growth in the Commonwealth. Also, a clear understanding of economic issues is central to my administration's efforts to create a positive environment for business development in Kentucky and to promote Kentucky as a vibrant business center.

Fortunately, Kentucky has a broad-based economy with a diversified group of manufacturers, a strong agricultural sector, and a plentiful supply of coal. With such a strong base, I believe we can do a great deal to strengthen Kentucky's economic position over the next four years.

During the first eleven months of my administration I have made every effort to correct some of the impediments that have stifled our industrial growth in the past. We have worked to establish programs that will make Kentucky more attractive to business and industry. For example, we have improved workmen's compensation rates, revised the corporate income tax structure, expanded industrial revenue bond financing, and expanded the capability of the Kentucky Development Finance Authority. With our efforts in these areas, we hope to establish Kentucky as a place where companies can expect their businesses to grow and prosper.

We have also initiated, through the Kentucky Department of Commerce, an aggressive advertising program that will emphasize the positive business environment in Kentucky. Our slogan, "Kentucky, the state that is run like a business," will carry the message into the boardrooms of America that our state, at last, has come into the mainstream of the burgeoning Sunbelt economy. It is very important to convey to the national and international business community that Kentucky is truly a sound and logical choice for future business development. The central location of Kentucky to population and business centers and its well developed transportation systems are critical elements in the location of new factories and plants. Also, the plentiful supply of coal as an energy source provides an added element of stability to future business plans. The high levels of worker productivity and the wide range of worker skills also enhance our position as a state that can adapt to the needs of a broad spectrum of industry. This is the story our advertising will tell, and I believe it will go a long way in improving our economic position.

While our nation is presently plagued by a national recession, I am confident that the efforts we are making now will sustain us so that we can emerge from the recession ready for a new and expanded level of economic growth and development.

While other states wait to see what the future brings, I want Kentucky to make the best of our favored position to turn depressed times. We have a great people and one of the nation's most productive work forces. We have a wealth of energy and other natural resources that rival and in some ways dwarf those of the Middle East.

And with a renewed commitment from an administration pledged to a brighter future, Kentucky truly can begin to reach its great potential in the Decade of the '80s.

Governor John Y. Brown, Jr.
Commonwealth of Kentucky
November 17, 1980

Governor John Y. Brown, Jr. has recently reappointed H. Clyde Reeves, Frankfort, to the Kentucky Council of Economic Advisors. Mr. Reeves' new KCEA term will extend to January 1, 1984. Mr. Reeves, past Commissioner of the Kentucky Department of Revenue, formerly vice-president of the University of Alabama at Huntsville, farmer, and active participant in many other ventures in both the private and public sectors, has been an enthusiastic and supportive member of the KCEA since he succeeded the late William G. Herzel on the Council in 1978. His broad base of experience within and outside of state government gives him a unique perspective on the needs of the Commonwealth for independent economic analysis and development of the Kentucky Economic Information System. We are pleased to have him continue as a member of the KCEA.

* * *

The Data Services office of the Reference Department of M. I. King Library, University of Kentucky, now offers university researchers who do not have their own CJS account the possibility for retrieval or manipulation of data from the public banks of the Kentucky Economic Information System (KEIS). This extension of the user services by the Data Services staff complements the bibliographic database searching services provided by them. For further information please contact Judith Wiza, Data Services Librarian, M. I. King Library (606-258-2831).

Reference librarians at other KECNET universities in Kentucky may also contact Margaret O. Adams, Manager of the KEIS (606-258-4626) for further information concerning implementation of a similar service.

* * *

Roy Sigafus, KCEA staff Senior Scientific Analyst/Programmer, has recently implemented new table-making programs for users of the county bank (CBANK) of the Kentucky Economic Information System (KEIS). Those familiar with program RANK will be happy to note the addition of program UNRANK, a variation which follows the same format and requires the same program control statements as RANK. The output from UNRANK, however, lists the counties in alphabetical order, instead of ranking them according to the value of the data series being displayed.

In last September's *News & Notes* column, we indicated that the annual *Kentucky Personal Income Report* will no longer be published; however, it is possible for anyone with access to the KEIS to replicate any or all of the personal income tables formerly reproduced in that report. Mr. Sigafus has written two new programs for the KEIS Procedure of the KEIS/Frankfort to make it easier for state government users of the KEIS to reproduce their own Kentucky personal income report. Both programs are variations of program BEATAB. The output from BEATAB is a table of personal income data for a two-year period for a single county, as designated by the user, and therefore BEATAB can be used to produce the personal income table for any selected county or Area Development District (ADD).

The two new programs BEAPI and BEAPIA, however, automatically produce the same output for *all* Kentucky's counties for the two most recent years in one job or submission to the computer. The output from program BEAPI follows exactly the order of tables as they were published in the *Kentucky Personal Income Report*, i.e., tables for the U.S. and Kentucky, followed by tables for each ADD and its component counties, in numerical order according to ADD designation. The output from program BEAPIA is organized in alphabetical order by county, followed by the tables for the ADDs, Kentucky, and the United States. Programs BEAPI and BEAPIA allow no options so the user simply responds with one of the new program names in response to the KEIS Procedure question: "Please enter the name of the program you wish to prepare . . ." and the program is immediately prepared for submission (batch only). Since one hundred thirty-seven tables are produced, the cost for running either BEAPI or BEAPIA is approximately $7.50. Anyone interested in further information should call Mr. Sigafus (KCEA, 606-258-4626).

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This quarterly publication is intended, primarily, to provide forecasts and current information concerning the Kentucky economy. More generally it provides a forum for the publication of short, expository articles dealing with current research or information systems, the focus of which is some aspect of the Kentucky economy.

Articles submitted for publication should be sent to the Editor at the address given above. All submissions will be reviewed independently by persons recognized as knowledgeable in the specific subject discussed. However, the ultimate responsibility for content rests with the author.

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KCEA Review and Forecast

by Charles W. Hultman*

As the economy moves through the final days of 1980 and into the beginning of a new year, indications generally are that economic recovery will be an unusually slow, gradual process. At the national level, Wharton Econometric Forecasting Associates, Inc., for example, projects that real Gross National Product (GNP) will increase about .33 percent in 1981 and that the unemployment rate will be about 7.98 percent, slightly higher than in 1980. The Reagan administration, much as the predecessor administration, must cope with severe inflationary pressures as it chooses among alternatives to promote expansion and growth.

Although the economic policies to be initiated by the Reagan administration have not been fully established and even then generally require Congressional action, the overall nature of the program seems apparent at this time. New policies are likely to include the abolishment of wage-price guidelines, a 10 percent personal income tax reduction for each of the next three years, a modest reduction in business taxes, and a decline in total government spending that will reflect an increase in defense spending as a share of the total. Much attention will be focused on ways to increase productivity.

On balance, the various national economic indicators point to a limited recovery, although the picture is partially mixed. The composite index of twelve leading indicators increased again in September but only slightly in October 1980; in addition, an index of new housing permits issued dropped sharply in October. Most importantly, the bank prime lending rate has increased more than 5 percentage points since the November 4 election date. It is clear that the rate of business activity could again decline; certainly any growth rate will be lower than that usually occurring once recovery takes place.

Inflation has continued to be a major problem–a problem which cannot be remedied without fear of a higher level of unemployment. Prices have increased by about 12 percent the past year, with the largest increases occurring in the cost of home ownership, fuels and gasoline and public transportation.

The unemployment that adversely affected the Kentucky economy during 1980 has been pervasive, but the greatest impact has been on such industries as construction, electric and electronic equipment, retail trade, and state and local education. In addition to the adverse impact of unemployment and reduced income, reduced tax receipts have made it difficult to carry on certain activities and has forced cutbacks in some government operations.

Kentucky's unemployment, which typically demonstrates a strong seasonal influence, was unusual in 1980 in that the usual decline in unemployment during the spring and summer months did not appear. Instead, the cyclical downswing outweighed the seasonal gains, and as a result, the unemployment level remained high throughout the year.

The rate at which economic recovery occurs in Kentucky over the next several months will depend to a great extent on what happens nationally, especially in the construction and auto industries, as well as in a variety of related industries, such as electric appliances, construction equipment, etc. These sectors are particularly affected by high interest rates, the current mortgage notes, for example, are generally in the 14 to 16 percent range.

The Kentucky Quarterly Econometric Model forecast (dated December 15, 1980) projects unemployment to be higher in both 1980 and 1981 than in 1979; the major employment gains in 1981 would occur in wholesale and retail trade and in coal mining. After declining slightly during 1980, real personal income is predicted to remain almost constant in 1981, although it is possible that there will be some growth during the second half of 1981, in response to the stimulative fiscal policies that may be pursued by the Reagan administration. Inflation will continue to be a problem, and is likely to be no less severe than that experienced during the past few years.

Kentucky, as well as the rest of the nation, will experience continued inflationary pressures during 1981. OPEC petroleum prices, difficulties in reducing the federal deficit, lagging productivity, stringent environmental and safety laws, and rising prices abroad, combine to create strong domestic pressures for continued price inflation. In addition, it is likely that food prices will increase significantly in 1981 due, in part, to the drought last summer. Peanut prices have already begun to increase; meat prices are expected to accelerate shortly.

In summary, the Kentucky economy and the national economy both are likely to experience inflation combined with sluggish economic performance during 1981. Monetary policies continue to be restrictive, retarding consumer expenditures on automobiles and other durable items, in particular–business expenditures for plant, equipment, and inventories; and residential construction. The pattern of the economy's performance in 1981 and later years will depend critically upon the monetary and fiscal policies that are pursued by the incoming administration and the Federal Reserve Board in the next year.

Charles W. Hultman is the Chairman of the KCEA and Associate Dean of the Office for Research, College of Business and Economics, University of Kentucky.

Kentucky Econometric Model Forecast

by Charles G. Renfro*

This forecast for Kentucky is based upon the December 3, 1980 *Post-Meeting Control Forecast* made by the Wharton Econometric Forecasting Associates, using the Wharton Quarterly Econometric Model of the United States (Mark 5.10). The Wharton forecast is for four quarters of very weak growth, at rates of less than 1 percent annualized, beginning in the third quarter of 1980. This national forecast projects the prime rate to average more than 17.5 percent during the first quarter of 1981 and the unemployment rate to rise to 8.1 percent by the third quarter. In particular, the forecast implies weak consumer durable expenditures and a rate of housing starts below 1.5 million until late in the third quarter of 1981. As a basis for their forecast, the Wharton Associates presume a significant increase in Social Security taxes on January 1, 1981 and assume a stimulative fiscal policy effective May 15; they assume a 10 percent marginal tax rate cut for individuals and an accelerated depreciation package for businesses, made retroactive to January 1, 1981.

The implications for Kentucky of this national scenario are shown in the tables on this page and pages 5 and 6 to include a decline in nonagricultural wage and salary employment through the fourth quarter of 1980, followed by weak growth in 1981; the pattern of the decline in 1980 results in a lower average employment in 1981 than in 1980, hence the annual change figure of -0.40 percent for 1981. Also projected is a decline in real personal income during 1980 and virtually no growth in 1981. The unemployment rate is projected to peak at 7.7 percent in the first quarter of 1981.

In fact, it is not unlikely that nationally there will be a negative rate of growth in real Gross National Product in the first quarter of 1981. This forecast for Kentucky is thus, if anything, optimistic, and should be regarded simply as suggesting the effect on Kentucky if the December 3 Wharton national forecast were to be realized. A more detailed assessment of the economic outlook for the United States and Kentucky will be provided in the forthcoming 1981 KCEA annual report.

It is important to note that, in the forecast tables, all the figures shown for 1979 and 1980 are still *forecasts*, as explained in the technical note on page 9 of the September 1980 *Review & Perspective*.

**Charles G. Renfro is the Executive Director of the KCEA.*

ANNUAL SUMMARY TABLE
SELECTED ECONOMIC INDICATORS

Description	1979	1980	1981
Personal Income (Millions)	26212.9	28689.4	31708.1
% Chg.: Ky. Personal Income	13.26	9.45	10.52
Real Personal Income (Millions 1972 $)	16045.2	15912.9	15942.9
% Chg.: Ky. Real Personal Income	4.25	-0.82	0.19
Wage and Salary Disbursement	15819.3	17033.4	18552.2
Mfg. Wage & Salaries	4669.8	4918.9	5433.1
Non-Mfg. Wage & Salaries	11149.6	12114.5	13119.2
Non-Agri. Wage & Salary Employment (Thousands)	1240.5	1214.5	1209.6
% Chg.: Ky. Non-Agri. Employment	0.79	-2.10	-0.40
Manufacturing Employment	294.4	281.8	282.7
Durable Goods	169.3	159.1	162.8
Non-Durable Goods	125.1	122.7	119.9
Non-Mfg., Non-Agri. Employment	946.1	932.7	926.9
Civilian Labor Force (Thousands)	1585.0	1571.2	1589.8
Ky. Unemployment Rate (%)	6.7	7.4	7.6

QUARTERLY FORECAST TABLE
SELECTED ECONOMIC INDICATORS

Description	1980.1	1980.2	1980.3	1980.4	1981.1	1981.2	1981.3	1981.4
Personal Income (Millions)	27825.5	28187.0	29126.0	29619.0	30319.3	31062.8	32262.0	33188.4
% Chg.: Ky. Personal Income	7.46	5.30	14.00	6.94	9.80	10.18	16.36	11.99
Real Personal Income (Millions 1972 $)	16028.5	15791.1	15950.7	15881.5	15849.1	15824.1	16018.9	16079.7
% Chg.: Ky. Real Personal Income	-3.48	-5.79	4.11	-1.72	-0.81	-0.63	5.01	1.53
Wage and Salary Disbursement	16837.9	16885.6	17147.9	17262.2	17663.5	18205.6	18874.5	19465.3
Mfg. Wage & Salaries	5037.6	4930.2	4828.7	4879.2	5117.4	5307.2	5541.6	5766.0
Non-Mfg. Wage & Salaries	11800.4	11955.5	12319.3	12383.0	12546.1	12898.4	13332.8	13699.3
Non-Agri. Wage & Salary Employment (Thousands)	1238.5	1219.6	1204.6	1195.2	1197.4	1207.6	1213.7	1219.6
% Chg.: Ky. Non-Agri. Employment	-0.42	-5.96	-4.81	-3.09	0.74	3.44	2.04	1.95
Manufacturing Employment	292.7	285.1	275.5	273.8	278.0	280.2	284.5	288.1
Durable Goods	164.9	161.1	154.9	155.5	158.0	160.6	164.4	168.0
Non-Durable Goods	127.9	124.0	120.5	118.2	120.0	119.6	120.1	120.1
Non-Mfg., Non-Agri. Employment	945.7	934.5	929.2	921.5	919.5	927.4	929.2	931.5
Civilian Labor Force	1592.4	1572.5	1561.3	1558.7	1570.6	1585.4	1595.9	1607.1
Ky. Unemployment Rate (%)	7.1	7.3	7.5	7.6	7.7	7.6	7.5	7.4

Forecast Date: December 15, 1980.

KENTUCKY QUARTERLY ECONOMETRIC MODEL

PERSONAL INCOME

DESCRIPTION	QUARTERLY 1980.1	1980.2	1980.3	1980.4	1981.1	1981.2	1981.3	1981.4	ANNUAL 1979	1980	1981
PERSONAL INCOME (MILLIONS)	27825.5	28187.0	29126.0	29619.0	30319.3	31062.8	32262.0	33188.4	26212.9	28689.4	31708.1
WAGE & SALARY DISBURSEMENTS	16837.9	16885.6	17147.9	17262.2	17663.5	18205.6	18874.5	19465.3	15819.3	17033.4	18552.2
NON-AGRI. WAGES & SALARIES	16708.5	16756.6	17020.5	17136.3	17498.3	18033.1	18705.8	19299.0	15704.0	16905.5	18384.0
MANUFACTURING	5037.6	4930.2	4828.7	4879.2	5117.4	5307.2	5541.6	5766.0	4669.8	4918.9	5433.1
DURABLE GOODS	2870.6	2763.7	2701.0	2759.6	2935.2	3006.8	3166.0	3334.1	2709.2	2773.7	3110.5
NON-DURABLE GOODS	2166.9	2166.5	2127.7	2119.6	2182.1	2300.4	2375.7	2431.9	1960.6	2145.2	2322.5
MINING	1158.3	1286.7	1311.5	1308.6	1338.4	1393.9	1446.5	1515.0	1083.5	1266.3	1423.4
COAL MINING	1083.0	1205.4	1227.2	1222.4	1250.2	1303.5	1353.1	1418.1	1012.8	1184.5	1331.2
OTHER MINING	75.3	81.4	84.3	86.2	88.2	90.4	93.4	96.9	70.7	81.8	92.2
CONTRACT CONSTRUCTION	955.2	870.1	909.2	866.9	750.4	804.6	879.4	936.2	962.6	900.3	842.7
REGULATED INDUSTRIES	1312.3	1324.2	1368.9	1379.7	1430.7	1452.3	1521.2	1574.8	1222.3	1346.3	1494.7
WHOLESALE & RETAIL TRADE	2603.4	2595.3	2645.1	2668.2	2750.2	2822.9	2919.0	3008.5	2480.8	2628.0	2875.2
SERVICES	2089.3	2159.9	2307.1	2349.9	2380.4	2485.0	2571.7	2627.3	1902.1	2226.6	2516.1
FINANCE, INS. & REAL ESTATE	603.2	623.4	655.1	647.7	678.0	687.4	715.9	725.9	556.5	632.4	701.8
GOVERNMENT	2949.2	2966.8	2995.1	3036.2	3052.9	3079.8	3110.5	3145.2	2826.4	2986.9	3097.1
CIVILIAN GOVERNMENT	2434.2	2444.8	2469.1	2504.2	2508.9	2518.8	2528.5	2558.2	2323.7	2463.1	2528.6
FEDERAL CIVILIAN	649.0	650.2	657.5	678.4	672.3	678.8	682.3	694.6	627.1	658.8	682.0
STATE & LOC. GOV'T	1785.2	1794.6	1811.6	1825.8	1836.6	1840.0	1846.2	1863.6	1696.6	1804.3	1846.6
FEDERAL MILITARY	515.0	522.0	526.0	532.0	544.0	561.0	582.0	587.0	502.8	523.8	568.5
AGRICULTURAL WAGE & SALARY	129.4	129.0	127.4	125.9	165.2	172.5	168.7	166.3	115.4	127.9	168.2
OTHER LABOR INCOME	2057.1	2085.4	2147.5	2184.1	2273.4	2386.9	2524.0	2650.0	1861.8	2118.5	2458.6
PROPRIETORS NET INCOME	2617.0	2434.9	2548.8	2675.6	2925.0	2970.1	2990.9	3056.0	2617.8	2569.1	2985.5
NON-FARM	2067.5	1909.8	2055.4	2209.5	2203.3	2266.2	2350.1	2455.9	1935.4	2060.6	2318.9
FARM	549.5	525.0	493.4	466.1	721.7	703.9	640.7	600.1	682.3	508.5	666.6
RESIDENCE ADJUSTMENT	292.5	294.0	298.0	303.0	313.0	322.0	331.2	340.3	269.6	296.9	326.6
OTHER INCOME ITEMS	7243.3	7696.3	8226.1	8445.7	8577.3	8643.6	9045.4	9210.3	6777.6	7902.8	8869.2
PROPERTY INCOME	3127.5	3430.4	3506.4	3652.1	3729.4	3777.8	3890.4	3993.9	2979.2	3429.1	3847.9
TRANSFER PAYMENTS	4115.8	4265.9	4719.7	4793.6	4848.0	4865.9	5154.9	5216.4	3798.5	4473.7	5021.3
LESS: PERSONAL CONTRIBUTIONS FOR SOCIAL INSURANCE	1222.4	1209.2	1242.3	1251.6	1433.0	1465.4	1503.8	1533.5	1133.2	1231.4	1483.9

FORECAST DATE: DECEMBER 15, 1980

KENTUCKY QUARTERLY ECONOMETRIC MODEL

EMPLOYMENT AND HOURS

DESCRIPTION	QUARTERLY 1980.1	1980.2	1980.3	1980.4	1981.1	1981.2	1981.3	1981.4	ANNUAL 1979	1980	1981
EMPLOYMENT											
TOTAL EMPLOYMENT (RES. ADJ.)	1479.8	1458.2	1444.4	1439.5	1449.7	1464.3	1475.9	1488.3	1478.1	1455.4	1469.5
NON-AGRI. EMPLOYMENT	1389.8	1368.1	1354.6	1349.9	1355.2	1369.4	1381.5	1394.7	1390.7	1365.6	1375.2
WAGE & SALARY EMPLOYMENT	1238.5	1219.6	1204.6	1195.2	1197.4	1207.6	1213.7	1219.6	1240.5	1214.5	1209.6
MANUFACTURING	292.7	285.1	275.5	273.8	278.0	280.2	284.5	288.1	294.4	281.8	282.7
DURABLE GOODS	164.9	161.1	154.9	155.5	158.0	160.6	164.4	168.0	169.3	159.1	162.8
NON-DURABLE GOODS	127.9	124.0	120.5	118.2	120.0	119.6	120.1	120.1	125.1	122.7	119.9
MINING	54.4	53.7	53.4	53.6	54.8	56.2	57.3	58.9	54.8	53.7	56.8
COAL MINING	49.0	48.5	48.2	48.3	49.4	50.8	51.7	53.2	49.5	48.5	51.3
OTHER	5.3	5.2	5.2	5.2	5.4	5.4	5.5	5.6	5.2	5.2	5.5
CONTRACT CONSTRUCTION	66.5	59.2	58.5	51.4	50.7	56.0	57.3	57.3	69.0	58.9	55.3
REGULATED INDUSTRIES	69.5	70.0	68.6	67.3	66.1	67.8	70.1	71.8	70.4	68.9	68.9
WHOLESALE & RETAIL TRADE	265.8	260.7	258.5	259.4	260.8	262.3	264.1	266.3	269.8	261.1	263.4
SERVICES	210.2	212.5	212.7	214.1	213.9	214.1	211.6	209.4	204.6	212.4	212.2
FINANCE, INSURANCE & REAL ESTATE	49.3	50.0	50.0	49.4	49.4	49.6	49.4	49.3	49.7	49.7	49.4
GOVERNMENT	230.1	228.4	227.5	226.3	223.8	221.5	219.5	218.6	227.8	228.1	220.8
FEDERAL	39.0	39.0	39.0	39.0	38.0	38.0	38.0	38.0	39.0	39.0	38.0
STATE & LOCAL	191.1	189.4	188.5	187.3	185.8	183.5	181.5	180.6	188.8	189.1	182.8
EDUCATION	111.3	110.1	109.8	109.2	108.8	107.3	106.1	106.0	105.3	110.1	107.0
OTHER	79.8	79.3	78.7	78.1	77.0	76.2	75.4	74.6	83.5	79.0	75.8
ALL OTHER NON-AG EMPL	151.3	148.5	149.9	154.7	157.7	161.8	167.8	175.1	150.2	151.1	165.6
AGRICULTURAL	73.0	73.1	72.8	72.5	77.5	77.9	77.4	76.6	70.4	72.8	77.4
HIRED WORKERS	22.9	22.7	22.1	21.4	26.3	26.3	25.4	24.4	21.1	22.3	25.6
FAMILY & OTHER UNPAID	50.1	50.4	50.7	51.1	51.2	51.6	52.0	52.2	49.3	50.6	51.7
HOURS & MANHOURS											
AVERAGE WEEKLY HOURS											
DURABLE MANUFACTURING	40.7	40.1	39.1	39.3	39.6	40.0	39.7	39.8	40.1	39.8	39.8
NON-DURABLE MANUFACTURING	40.2	40.6	39.7	39.8	40.0	40.0	40.0	40.0	39.5	40.1	40.0
MANHOURS											
TOTAL MANUFACTURING	6163.0	5974.5	5641.8	5628.3	5752.5	5827.3	5888.3	5972.7	6099.1	5851.9	5860.2
DURABLE GOODS	3489.7	3357.6	3153.2	3181.6	3256.6	3340.7	3391.2	3474.5	3531.7	3295.5	3365.8
NON-DURABLE GOODS	2673.3	2616.9	2488.6	2446.8	2495.8	2486.7	2497.1	2498.2	2567.5	2556.4	2494.4
DAYS & MAN-DAYS											
COAL MINING DAYS WORKED	48.2	53.4	53.8	52.5	51.7	51.6	51.7	51.8	47.1	52.0	51.7
COAL MINING MAN DAYS	9459.0	10354.0	10367.8	10156.1	10215.3	10475.5	10694.0	11022.5	9339.7	10084.2	10601.8
LABOR FORCE											
RESIDENT ADJUSTED LABOR FORCE	1592.4	1572.5	1561.3	1558.7	1570.6	1585.4	1595.9	1607.1	1585.0	1571.2	1589.8
LABOR FORCE (NOT RES. ADJ.)	1575.4	1555.5	1544.3	1541.7	1553.6	1568.4	1578.9	1590.1	1568.0	1554.2	1572.8
UNEMPLOYMENT	112.6	114.3	116.9	119.2	120.9	121.1	120.0	118.8	106.9	115.8	120.3
UNEMPLOYMENT RATE (%)	7.1	7.3	7.5	7.6	7.7	7.6	7.5	7.4	6.7	7.4	7.6

FORECAST DATE: DECEMBER 15, 1980

Recommendations of the President's Commission on Coal: A Commentary

by Curtis E. Harvey*

In March 1980, twenty-two months after its creation, the President's Commission on Coal published its first set of findings.[1] The Commission was appointed in the spring of 1978 in response to the consequences of the record coal industry strike of 1977-78. West Virginia Governor John D. Rockefeller IV chaired the Commission, which also included Jesse F. Core, Marvin Friedman, W. Dewey Presley, and Willard Wirtz. Soon after its establishment, new concerns arose which had the effect of broadening the Commission's task. Foreign oil prices doubled, the "Three Mile Island" accident raised doubts about the future of nuclear power, the Russians invaded Afghanistan and there was continued strife in the Near East. All of these developments underscored the tenuousness of U.S. foreign oil supplies.

If there is virtue in brevity, this Commission's report has it. It is short, concise, and specific in most of its policy prescriptions. Unfortunately it is also somewhat shallow in its analytical content. Most disappointing is the absence of any examination of the export market for U.S. coal. Limited by time, the Commission's staff was unable to perform its own vigorous analysis and instead drew together research findings from diverse sources which it then forged into a base for policy recommendations.[2] These recommendations, interdependent in nature, emphasized four areas: the future of the coal industry, labor-management relations, living conditions of coal miners, and the effects of government regulations on the production and utilization of coal.

In broad perspective, the report examines the human and environmental impacts of the expanded use of coal as an energy fuel in the 1980s. It first makes the case for replacing imported oil with coal, drawing mostly on the well-known argument that continued reliance on imported oil engenders foreign dependence and risks to our national security. Since this view is well accepted now, it is a moot point. More significant are the questions of when and how fast the dependence on foreign oil should be reduced, and the relative public costs of various actions to accomplish this reduction. The answers to these questions are extremely important for the nation, and in particular for Kentucky, the major coal producing state.

There is little doubt that a substantial conversion from oil to coal will occur soon in the United States, Western Europe and Japan. On a modest scale, it has already started. The 1979 OPEC price increases clearly unmasked the fact that oil is no longer a feasible boiler fuel in industry or for electric power companies. The actual conversion to coal may be very gradual and growth of the coal industry painfully slow, however, since at this time the industry has an excess production capacity roughly equal to 20 percent of its output.

There are two basic reasons for anticipating a delay in the expanded use of coal. First is the enormous capital cost which a rapid conversion to coal would precipitate. The Commission report estimates that the costs of adopting an accelerated coal-oil replacement program would amount to $90 billion (at constant prices) by 1990. The report also asserts that these costs can be passed on to consumers in the form of higher power rates. But this would not be an easy task.

The second reason for the delay is a change in the demand for electric power, attributable to the weak state of the economy and to the cumulative impact of conservation. Both factors have had a strong influence. The electric utilities have been revising downward their projected capacity requirements and it is therefore not surprising to find that they are reluctant to abandon their oil-fired furnaces so long as these continue to function and are not fully utilized. Under these circumstances, serious opposition to higher power rates develops not only from consumers, but from power companies as well, and coal conversion is delayed. Economic reality suggests therefore that we are likely to witness a gradual conversion from oil to coal, but only as old oil furnaces wear out or become obsolete. In the absence of legislative *dicta*, the strength of the conversion will be determined more by economic calculus and less by vague threats to our national security.

In its examination of the impacts expanded coal use would have on the environment, the Commission believes that increased coal combustion need not compromise the environment. The report indicates that even if two million barrels of oil are replaced daily with coal, existing ambient air standards can be maintained, if coal is burned cleanly. This is essential to maintain health standards and to prevent increased acidity in rain water and lakes. In the long run, however, decisions to expand coal combustion must also consider the impact of warming the planet, a probable result of increasing the atmospheric concentrations of carbon dioxide.

On the supply side, the report suggests that the provisions of the Surface Mining Control and Reclamation Act of 1977 adequately safeguard the preservation of coal lands, but not without hardship to some coal producers. Small operations, and in particular those mining on steep slopes, are adversely affected by the new act. Escalating costs, the result of higher expenditures on required engineering, design, and environmental studies, and higher bonding costs, have tended to inhibit entry into the industry. For these and other reasons, small operators are finding it increasingly difficult to compete. The consequence is the near demise of small operators and the expansion of larger ones. A number of effects attend this trend in firm size, some positive, others negative, but all too involved

(continued on page 10)

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selected indicators OF ECONOMIC A

These tables of selected indicators of economic activity were prepared by a special-purpose program of the Kentucky Economic Information System. The data in the tables are reported figures which were obtained from a variety of state and federal agencies, as well as from private firms.

UNITED STATES DATA

	Jul. 1980	Aug. 1980	Sept. 1980	Qtr. III 1980	% Chg. 80-II 80-III	% Chg. 79-III 80-III
CONSUMER PRICE INDEXES (1967=100, NOT SEASONALLY ADJUSTED)						
CONSUMER PRICE INDEX, ALL URBAN CONSUMERS (CPI-U), ALL ITEMS	247.80	249.40	251.70	249.63	1.89	12.89
CONSUMER PRICE INDEX, ALL URBAN CONSUMERS (CPI-U), FOOD AND BEVER	248.30	252.00	254.20	251.50	2.99	9.05
CONSUMER PRICE INDEX, ALL URBAN CONSUMERS (CPI-U), HOUSING	265.10	265.80	267.70	266.20	1.56	14.99
CONSUMER PRICE INDEX, ALL URBAN CONSUMERS (CPI-U), APPAR & UPKEEP	176.20	178.60	182.20	179.00	0.94	7.31
CONSUMER PRICE INDEX, ALL URBAN CONSUMERS (CPI-U), TRANSPORTATION	251.00	252.70	254.70	252.80	1.73	15.33
CONSUMER PRICE INDEX, ALL URBAN CONSUMERS (CPI-U), MEDICAL	266.60	268.40	270.60	268.53	1.96	11.06
CONSUMER PRICE INDEX, ALL URBAN CONSUMERS (CPI-U), ENTERTAINMENT	206.60	208.00	209.80	208.13	2.06	9.47
CONSUMER PRICE INDEX, ALL URBAN CONSUMERS (CPI-U), OTHER	213.50	214.50	220.60	216.20	2.38	9.21
CONSUMER PRICE INDEX (CPI-U), SPECIAL INDEX: ENERGY	370.40	370.70	370.10	370.40	1.96	25.18
PRODUCER PRICE INDEXES (1967=100, NOT SEASONALLY ADJUSTED)						
PRODUCER PRICE INDEX, ALL FINISHED GOODS	246.60	249.00	248.90	248.17	2.68	13.80
PRODUCER PRICE INDEX, FINISHED CONSUMER GOODS	249.10	251.80	251.80	250.90	3.04	14.95
PRODUCER PRICE INDEX, INTERMEDIATE MATERIALS	280.30	282.60	284.10	282.33	2.09	13.98
PRODUCER PRICE INDEX, INTERMEDIATE MATERIALS FOR MANUFACTURING	264.70	267.20	268.40	266.77	1.74	11.98
PRODUCER PRICE INDEX, CRUDE MATERIALS	316.30	327.70	331.80	325.27	8.75	13.85
PRODUCER PRICE INDEX, CRUDE FOODSTUFFS AND FEEDSTUFFS	263.30	276.60	276.70	272.20	13.27	9.39
PRODUCER PRICE INDEX, BITUM. COAL, INDUSTRIAL,SPOT(1967=100)	396.10	395.80	398.70	396.87	0.66	0.92
PRODUCER PRICE INDEX, BITUM. COAL, INDUSTRIAL,CONTRACT(JUNE76=100)	132.70	133.10	133.90	133.23	0.88	4.09
CONSUMER PRICES: ENERGY (U.S. CITY AVERAGE)						
AVG PRICE FOR UTILITY (PIPED) GAS, PER 40 THERMS	17.18	17.30	17.43	17.30	3.33	16.96
AVG PRICE FOR UTILITY (PIPED) GAS, PER 100 THERMS	40.41	40.65	41.04	40.70	7.27	23.99
AVG PRICE FOR ELECTRICITY, PER 500 KWH	31.51	31.57	31.75	31.61	7.37	19.99
AVG PRICE FOR FUEL OIL #2 (HOME HEATING OIL), PER GALLON	1.02	1.02	1.02	1.02	0.79	27.58
AVG PRICE, GASOLINE, ALL TYPES, PER GALLON	1.25	1.24	1.23	1.24	-0.29	28.53
AVG PRICE, GASOLINE, LEADED REGULAR, PER GALLON	1.22	1.21	1.20	1.21	-0.58	28.29
AVG PRICE, GASOLINE, UNLEADED REGULAR, PER GALLON	1.27	1.27	1.26	1.26	-0.11	28.34
AVG PRICE, GASOLINE, LEADED PREMIUM, PER GALLON	1.31	1.31	1.30	1.31	0.87	30.48
LABOR FORCE (SEASONALLY ADJUSTED)						
LABOR FORCE, CIVILIAN (MILLIONS)	105.20	105.02	105.03	105.09	0.37	1.79
EMPLOYMENT, TOTAL (MILLIONS)	97.00	97.01	97.21	97.07	0.18	-0.17
EMPLOYMENT, AGRICULTURE	3.26	3.18	3.44	3.29	0.68	-0.67
EMPLOYMENT, NONAGRICULTURAL INDUSTRIES	93.74	93.83	93.76	93.78	0.16	-0.15
UNEMPLOYMENT RATE, TOTAL	7.80	7.60	7.50	7.63	1.78	31.61
UNEMPLOYMENT RATE, BLACKS & OTHER RACIAL MINORITIES	14.20	13.60	14.20	14.00	4.74	28.05
OTHER SELECTED NATIONAL INDICATORS:						
U.S. GROSS NATIONAL PRODUCT (B $) (% CHG AT ANNUAL RATE)	NA	NA	NA	2586.50	10.75	7.93
U.S. REAL GROSS NATIONAL PRODUCT (B 72$) (% CHG AT ANNUAL RATE)	NA	NA	NA	1411.70	0.88	-1.51
PERSONAL INCOME, TOTAL, SEASONALLY ADJUSTED (B $)	2124.40	2143.00	2166.50	2144.60	3.08	10.17
COMPOSITE INDEX OF 12 LEADING INDICATORS (1967=100)	128.40	131.10	135.10	131.53	5.99	-6.36
INDEX OF INDUSTRIAL PRODUCTION, SEASONALLY ADJUSTED (1967=100)	140.40	141.80	143.70	141.97	-1.75	-6.83
INTEREST RATE, YIELD ON 3-MONTH TREASURY BILLS	8.13	9.26	10.32	9.24	-8.09	-26.88
PRIVATE RESIDENTIAL BLDG. 16000 PERMIT ISSUING PLACES (SADJ THOU)	1236.00	1361.00	1564.00	4161.00	54.57	-14.73
TOTAL INSTALLMENT CREDIT OUTSTANDING AT END OF MONTH (B $)	301.75	303.26	304.71	303.24	-0.17	1.22

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KENTUCKY DATA

	Jul. 1980	Aug. 1980	Sept. 1980	Qtr. III 1980	% Chg. 80-II 80-III	% Chg. 79-III 80-III
LABOR FORCE (NOT SEASONALLY ADJUSTED, THOUSANDS)						
LABOR FORCE, TOTAL CIVILIAN	1599.80	1615.30	1638.70	**1617.93**	1.88	2.50
EMPLOYMENT, TOTAL, BY PLACE OF RESIDENCE	1471.90	1488.20	1511.50	**1490.53**	0.69	-0.26
EMPLOYMENT, AGRICULTURAL	72.10	82.20	87.10	**80.47**	13.92	-2.23
EMPLOYMENT, TOTAL NON-AGRICULTURAL	1399.80	1406.00	1424.40	**1410.07**	0.03	-0.14
UNEMPLOYMENT RATE	8.00	7.90	7.80	**7.87**	16.07	47.68
EMPLOYMENT, TOTAL NON-AGRICULTURAL WAGE AND SALARY	1189.50	1187.50	1200.80	**1192.60**	-1.94	-4.46
EMPLOYMENT, BITUMINOUS COAL & LIGNITE MINING (SIC 12)	46.80	46.70	47.00	**46.83**	-2.02	-6.02
EMPLOYMENT, CONTRACT CONSTRUCTION	64.10	63.60	62.40	**63.37**	5.26	-18.55
EMPLOYMENT, TOTAL MANUFACTURING	265.50	265.00	265.60	**265.37**	-4.03	-9.42
EMPLOYMENT, MANUFACTURING, DURABLE	144.90	142.90	144.50	**144.10**	-6.18	-14.41
EMPLOYMENT, MANUFACTURING, NON-DURABLE	120.60	122.10	121.10	**121.27**	-1.33	-2.68
EMPLOYMENT, TRANSPORTATION, COMMUNICATIONS & PUBLIC UTILITIES	68.40	68.50	67.80	**68.23**	-1.11	-3.67
EMPLOYMENT, WHOLESALE & RETAIL TRADE	258.70	257.50	259.50	**258.57**	-0.98	-4.76
EMPLOYMENT, FINANCE, INSURANCE & REAL ESTATE (SIC 60-67)	51.10	50.60	50.40	**50.70**	0.20	0.20
EMPLOYMENT, SERVICES (SIC 70-80)	212.30	213.50	213.00	**212.93**	-0.09	3.68
EMPLOYMENT, CIVILIAN GOVERNMENT	217.00	216.50	229.70	**221.07**	-4.86	-1.18
EMPLOYMENT, STATE & LOCAL GOVERNMENT	173.60	174.80	189.30	**179.23**	-5.96	-1.65
HOURS AND EARNINGS OF PRODUCTION WORKERS IN MANUFACTURING						
AVG WEEKLY HOURS, PROD WORKERS, TOTAL MANUFACTURING	37.30	38.80	39.10	**38.40**	-0.60	-1.87
AVG WEEKLY HOURS, PROD WORKERS, MANUFACTURING DURABLES	36.40	38.90	39.30	**38.20**	-1.12	-4.02
AVG WEEKLY HOURS, PROD WORKERS, NON-DURABLE MANUFACTURING	38.50	38.70	38.90	**38.70**	0.26	1.22
AVG HOURLY EARN, PROD WORKERS, TOTAL MANUFACTURING	7.36	7.43	7.50	**7.43**	2.58	8.41
AVG HOURLY EARN, PROD WORKERS, MANUFACTURING DURABLES	7.93	7.98	8.05	**7.99**	3.36	9.86
AVG HOURLY EARN, PROD WORKERS, NON-DURABLE MANUFACTURING	6.68	6.75	6.82	**6.75**	2.02	7.14
AVG WEEKLY EARN, PROD WORKERS, TOTAL MANUFACTURING	274.53	288.28	293.25	**285.35**	1.97	6.39
AVG WEEKLY EARN, PROD WORKERS, MANUFACTURING DURABLES	288.65	310.42	316.37	**305.15**	2.23	5.46
AVG WEEKLY EARN, PROD WORKERS, NON-DURABLE MANUFACTURING	257.18	261.23	265.30	**261.24**	2.28	8.45
INDEX OF PRICES RECEIVED BY KY FARMERS (1972=100)						
INDEX OF PRICES REC'D BY KY FARMERS, CROP AND LIVESTOCK PRODUCTS	168.39	171.53	171.97	**170.63**	3.49	-1.84
INDEX OF PRICES REC'D BY KY FARMERS, LIVESTOCK PRODUCTS	162.20	169.97	170.90	**167.69**	9.05	-4.77
INDEX OF PRICES REC'D BY KY FARMERS, CROPS	172.26	172.50	172.64	**172.47**	0.38	0.05
MINING (MILLIONS OF TONS, THOUSANDS OF TAX DOLLARS)						
BITUMINOUS COAL & LIGNITE, PHYSICAL OUTPUT, EASTERN KY, TOTAL	8.20	8.54	8.35	**25.09**	-9.04	-3.64
BITUMINOUS COAL & LIGNITE, PHYSICAL OUTPUT, WESTERN KY, TOTAL	2.93	3.50	2.84	**9.27**	-16.07	-1.97
AVG HOURLY EARN, PROD WORKERS, BITUMINOUS COAL & LIGNITE MINING	11.43	11.09	11.08	**11.20**	-1.58	3.19
AVG WEEKLY EARN, PROD WORKERS, BITUMINOUS COAL & LIGNITE MINING	380.62	440.27	445.42	**422.10**	-8.48	5.41
AVG WEEKLY HOURS, PROD WORKERS, BITUMINOUS COAL & LIGNITE MINING	33.30	39.70	40.20	**37.73**	-6.91	2.35
TAX RECEIPTS, COAL SEVERANCE, CONSOLIDATED, TOTAL	14793.87	11587.79	16209.39	**42591.05**	*	8.23
CONSTRUCTION (MILLIONS OF $, NO. OF PRIVATE RESID. UNITS--NOT SEAS ADJ)						
VALUE OF CONSTRUCTION CONTRACTS, RESIDENTIAL & NON-RES	166.90	128.40	183.30	**478.60**	22.65	-17.22
PERMIT AUTHORIZED CONSTRUCTION, NO. OF 1-FAMILY RESID. UNITS	592.00	769.00	766.00	**2127.00**	41.24	-9.45
VALUE OF PERMIT AUTHORIZED CONSTRUCTION, 1-FAMILY RESID. UNITS	26.23	31.44	34.80	**92.47**	50.37	-4.56
PERMIT AUTHORIZED CONSTRUCTION, NO. OF RESID. UNITS, TOTAL	874.00	1190.00	1375.00	**3439.00**	20.71	-13.90
VALUE OF PERMIT AUTHORIZED CONSTRUCTION, ALL RESID. UNITS, TOTAL	32.43	40.63	48.53	**121.59**	35.31	-6.86
RETAIL SALES (000$, 000 CARS)						
TAX RECEIPTS, GENERAL FUND, SALES AND GROSS RECEIPTS	53345.70	53845.95	57545.88	**164737.50**	*	11.60
NEW PASSENGER CAR REGISTRATIONS, TOTAL, NOT SEAS. ADJ.	6.07	2.00	1.88	**9.95**	-41.06	-66.43
FINANCE AND INSURANCE (MILLIONS OF DOLLARS)						
NET LOANS MADE & ACQUIRED BY KY. SAVINGS & LOAN ASSOCIATIONS	39.72	72.94	71.84	**184.50**	211.56	-8.49
SALES OF ORDINARY LIFE INSURANCE	392.44	340.23	356.40	**1089.07**	-7.41	6.11
SELECTED STATE GOVERNMENT RECEIPTS						
TAX AND NONTAX RECEIPTS, GENERAL FUND, TOTAL (MIL $)	114.08	142.53	162.95	**419.56**	*	17.63
TAX RECEIPTS, GENERAL FUND, SALES & USE TAXES, TOTAL (THOU $)	49088.65	49976.93	53096.61	**152162.13**	*	12.53
TAX RECEIPTS, GENERAL FUND, INCOME TAX, INDIVIDUAL (THOU $)	27505.65	64265.93	49880.80	**141652.31**	*	31.36
TAX RECEIPTS, GENERAL FUND, INCOME TAX, CORPORATION (THOU $)	5798.62	4307.60	26033.51	**36139.73**	*	9.38
TAX RECEIPTS, STATE ROAD FUND, STATE SHARE (THOU $)	24231.52	22093.39	21036.09	**67360.94**	*	-10.00
TAX RECEIPTS, STATE ROAD FUND, MOTOR FUELS NORMAL, TOTAL (THOU $)	15336.57	13349.55	11798.13	**40484.25**	*	-5.57
TAX RECEIPTS, STATE ROAD FUND, MOTOR VEHICLE USAGE TAX (THOU $)	7140.24	7050.26	8004.73	**22195.24**	*	-18.34

PRIVATE SOURCES FOR THE ABOVE DATA INCLUDE:
F. W. DODGE DIVISION (MCGRAW-HILL INFORMATION SYSTEMS COMPANY), VALUE OF CONSTRUCTION CONTRACTS;
LIFE INSURANCE MARKETING & RESEARCH ASSOCIATION, SALES OF ORDINARY LIFE INSURANCE;
R. L. POLK & COMPANY, NEW CAR REGISTRATIONS

* = QUARTER TO QUARTER COMPARISONS NOT MEANINGFUL DUE TO SEASONAL VARIATION

(continued from page 7)

for discussion here. One of the more interesting effects, however, is the impact of this trend on the industry's surge capability to produce coal in times of urgent need.

Traditionally, whenever a surge in demand propels upward price, small firms quickly activate dormant operations. They just as quickly stop mining when demand slackens and prices fall below marginal costs. By these actions, small firms contribute a certain degree of stability to the price of coal. Their permanent departure from the industry will have a decidedly destabilizing influence on spot prices and it would therefore not be uncommon to see spot prices fluctuate widely in the future. Enlarged coal stockpiles could, of course, counteract this tendency, very much in the same manner as vast oil stocks have prevented oil prices from skyrocketing in the last few months, due to the Iran-Iraq conflict. However, stockpiling of coal, or indeed of any material, is not costless and creates an additional cost burden for consumers.

The remaining three sections of the Commission's report deal with improved safety in mining, the need to upgrade living conditions for miners and their families, and ways to enhance labor-management relations. Recent events in West Virginia and eastern Kentucky underscore the responsibility of labor, management, and public authorities to work for the improvement of safety in mining. The Commission's report is unequivocal in its commitment to make underground mining safer, particularly in mines employing fifty or fewer persons. It is in these mines that more than 40 percent of all underground fatalities occur, but unacceptably high fatality rates also characterize several of the larger mines.

The expanded use of coal will increase miners' concerns over their living conditions. Salaries for miners have risen sharply in recent years and for most, the standard of living has risen accordingly. However, in the area of home ownership, a general scarcity of level land in the mountains has kept lot prices high, thereby excluding many families from adequate housing. The Commission's report suggests that public authorities exercise their right of eminent domain and acquire or set aside level land for private home building. This suggestion raises complicated questions concerning property rights, the answers to which can only be found by the courts. Perhaps a speedier solution would be to provide public assistance for improving the design and technology of home construction on sloped surfaces. It is certainly within the state of the art to build attractive and functional housing on sloped land and still keep construction costs within bounds.

The Commission's report is remarkably silent on the issue of educational opportunities in coal producing regions. This aspect of a mining family's standard of living is critically important for its future and for that of the region. Its significance should not be ignored.

The final issue discussed in the report concerns labor-management relations. These relations have stabilized and improved substantially in the last three years. Wildcat strike activity and "stranger" picketing have subsided greatly, and a growing appreciation for good labor-management relations seems to be emerging, along with an appreciation for the fact that conflict reduction enhances productivity. Continued future dialogue and cooperation can contribute greatly to making coal a more desirable fuel. Compared with Australia, for example, where thirty-two different unions interact between the mining of coal and its loading onto ship for export, U.S. labor-management relations are far more stable. Foreign buyers of coal are concerned both with on-time delivery and with delivered prices. Stable labor-management relations reduce risks and delays in delivery and make U.S. coal attractive on the international market.

The Commission's report does not examine the export market for U.S. coal, either explicitly or by inference. And yet foreign demand, and its potential, are very important for the central Appalachian coal regions. There has been a recent surge in the foreign demand for U.S. coal and it was precipitated by three developments: first, a 70 percent increase in the export price of Australian steam coal during the past twelve months;

TABLE 1

SELECTED OCEAN FREIGHT RATES–AS OF MAY 19, 1980
($/Long Ton; 35/60,000 Unit Size)

Port of Origin	Destination	Cost
U.S. North Hatteras or U.S. Gulf Coast	Dunkirk (France)–Hamburg (West Germany) Range West Coast Italy	$15.00
U.S. North Hatteras or U.S. Gulf Coast	Japan	26.50
New Castle, Sidney, Australia	Dunkirk (France)–Hamburg (West Germany) Range West Coast Italy	25.00
New Castle, Sidney, Australia	Japan	19.00

From data reported by *Coal Trade Freight Report*, republished in *World Coal*, June 1980, p. 17.

second, delays in deliveries due to labor unrest abroad; and finally, sharply higher ocean freight rates. Table 1 illustrates the significant transport cost advantage now held by U.S. coal exporters over their Australian counterparts for shipments to Western Europe. A comparsion of shipping rates to Japan is also shown. In addition to their shipping cost differences, American exporters have met delivery dates more reliably in the past than have Australian shippers. Of late, delays in Australian shipments have been a particularly bothersome problem for European buyers. Consequently, in an effort to reduce risk, they have increasingly sought out American suppliers. Table 2 shows the dramatic rise in recent U.S. exports.

TABLE 2

U.S. BITUMINOUS COAL EXPORTS
(EXCLUDING EXPORTS TO CANADA)

Year	Short Tons (000)
1976	42,908
1977	36,059
1978	24,586
1979	45,604
1980	70,000*

*Estimated for year end, as of September 1980.

SOURCE: U.S. Department of Commerce.

The surge in U.S. coal exports has unmasked a number of dormant problems. Most prominent among them are bottlenecks at U.S. ports caused by their inability to test, blend, store, and load large quantities of coal. Ships are forced to lie at anchor for many weeks, waiting for an opportunity to berth. In the meantime, demurrage charges accumulate mercilessly, undermining the delivered price advantage of U.S. coal.

To counteract this threat, coal companies, railroads, and port authorities have announced plans for sizable port expansion and construction projects, involving millions of dollars. If all projects are in fact implemented in the next few years, U.S. capacity to export coal from the East and Gulf Coast would at least triple, to over 200 million tons per annum. This capacity would greatly exceed the amount of coal the Western European nations can use, even under the most optimistic of scenarios. Therefore the improvement of one or more of the existing ports to handle deep water bulk carriage in the 150,000 to 200,000 dead-weight ton class (the size ship now being designed for least-cost transport), might be more appropriate. Because of high capital costs, it probably would be desirable to finance such expansions under joint private-public sponsorship.

For a number of reasons, but primarily because of the cost disadvantages of transport to seacoast ports, Kentucky has not exported much coal in the past. As Table 3 illustrates, estimates of exports from eastern Kentucky between 1970 and 1977 fluctuated between .91 and 3.0 million tons annually, most originating in Pike County. The merger of the L&N and Chessie System railroads, and the completion of the Deane, Kentucky link between them, should shorten considerably the distance that eastern Kentucky coal has to travel to port. This should make eastern Kentucky coal more attractive to foreign buyers.

In June 1980, the leaders of the world's industrialized democracies, meeting in Venice, Italy, underscored the need to substitute coal for oil. Given the sizable shipping cost advantage of U.S. coal over coal from other countries, U.S. coal should remain attractive abroad, especially to western Europe. The potential of the foreign market is considerable, and Kentucky operators are now in good position to increase their share in it.

TABLE 3

COAL EXPORTS FROM EASTERN KENTUCKY COUNTIES
(000 Short Tons)

Year	Breathitt	Floyd	Harlan	Johnson	Knott	Lee	Letcher	Magoffin	Perry	Pike	Whitley	Total
1970	–	21	35	–	–	10	–	–	150	2,817	–	3,033
1971	–	11	–	–	–	–	–	–	–	2,106	–	2,117
1972	–	–	–	–	–	–	–	–	–	1,205	–	1,205
1973	–	–	–	–	–	–	–	–	42	1,937	78	2,057
1974	19	–	7	3	–	–	–	–	55	1,490	–	1,574
1975	–	–	–	–	–	–	–	26	–	1,129	–	1,155
1976	–	–	–	–	–	–	–	–	–	910	–	910
1977	–	–	–	–	34	–	258	–	–	1,438	–	1,730

SOURCE: Office of Coal and Electric Power Statistics, Energy Information Administration, U.S. Department of Energy.

Notes

[1] President's Commission on Coal, *Recommendations and Summary Findings* (Washington, D.C.: U.S. Government Printing Office), March 1980, 26 pp. Companion publications are *The Acceptable Replacement of Imported Oil With Coal, the Staff Report to the President's Commission on Coal* (Washington, D.C.: U.S. Government Printing Office), March 1980, 66 pp., and President's Commission on Coal, *Coal Data Book* (Washington, D.C.: U.S. Government Printing Office), February 1980, 235 pp.

[2] These sources include the Department of Energy, Energy Information Administration (DOE/EIA); I.C.F., Inc.; Energy and Environmental Analysis, Inc. (EEA); Department of Labor, Mine Safety and Health Administration (DOL/MSHA); Bituminous Coal Operators Association (BOCA); United Mine Workers (UMW) and others.

Computer Mapping for Resource Analysis

by Craig G. Ericksen*

The Kentucky Department of Natural Resources and Environmental Protection is currently implementing a unique computer mapping and analysis system known as the Kentucky Natural Resources Information System (KNRIS). The system is being developed in the Department's Bureau of Surface Mining Reclamation and Enforcement in order to meet certain requirements of the Federal Surface Mining Act of 1977, but potential applications for the system go far beyond individual programs within the Department. Although KNRIS has several components, including a LANDSAT satellite image processing facility, maps, and publications, the core of the system is a computerized geographic information system (GIS). This GIS allows users to quickly perform sophisticated resource analysis for relatively large portions of the Commonwealth. The following article describes the concept behind this unusual technology, outlines the various analytical capabilities of the GIS, and describes the current and potential data base.

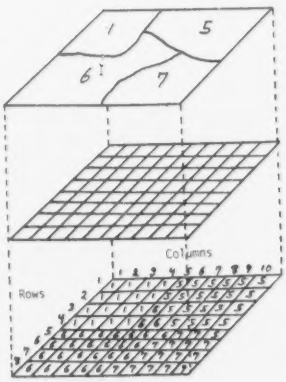
The Commonwealth of Kentucky covers some thirty-nine thousand square miles of land with diverse natural characteristics and varying levels of human impact. Information concerning these characteristics has been collected since explorers first entered the region and drew rough maps or made associated journal entries. Thus, for perhaps two hundred and fifty years, various types of static and dynamic information have been collected and stored in different forms and in many locations throughout the state and nation. One thread of commonality running through much of this information is spatial or geographic specificity; there is, for example, economic data at the state and county level, land use data covering only a few acres of an Appalachian watershed, etc. Such georeferenced information is most frequently stored either on maps depicting census tracts, soils, political boundaries, topography, etc. or in publications. In Kentucky, a considerable volume of state and county level economic data are stored and accessible for retrieval or analysis in the data banks of the Kentucky Economic Information System (KEIS), a public, computer-based data resource which has been developed and is maintained by the staff of the Kentucky Council of Economic Advisors.[1]

Until the last decade, however, there has been no method for efficiently storing the many types or "layers" of large and small-scale georeferenced data, in one place, so that researchers and analysts could gain easy access to a uniform, multidisciplinary and detailed data base. Just as important, there was no automated method for efficiently comparing, combining or manipulating the data, nor for deriving various statistics from them.

In the mid-1960s, researchers at Harvard University recognized that evolving computer technology potentially provided a vehicle through which large quantities of spatially-oriented information could be stored in an organized fashion. In early efforts to make computers "think" like multilayer maps, areas were gridded to provide a matrix of specific cells on an X, Y coordinate basis and each grid, often several hundred acres in size, was imbued with information describing the spatial attributes of the parcel, e.g., general socioeconomic or natural resource characteristics. Figure 1 illustrates a grid of a land area and some information that might be stored therein. Unlike econometric analysis, early computer mapping was not especially concerned with time-series data and analysis but was instead concerned with encoding the latest available parameters so that various forms of planning and analysis could be performed. The assumption was that the most current data accurately reflected real-time conditions. The main exception to this orientation was the interest in monitoring progressive land use changes, often with the aid of remote sensing.

FIGURE 1

GRID OF A LAND AREA



Original Map of Land Use in a County

Grid Overlay

Grid Cell Map

As the technology of computer mapping or graphics progressed, two parallel tracks of intensive investigation evolved. The first was an attempt to more accurately store the data that was being generalized in grid systems; the second related to expansion of the data-storage orientation of such systems so that complex analytical capabilities would be available.[2] Several alternative approaches were taken by different groups to resolve the issue of the optimal data storage. One of the techniques developed was "polygon overlay" and it is now widely accepted as being the most accurate and flexible data storage structure.[3] This technology is currently employed within KNRIS and it is illustrated by Figure 2. The polygon approach allows the boundaries of any feature to be placed, or "digitized," into the host computer in a series of data element

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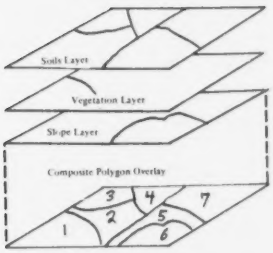
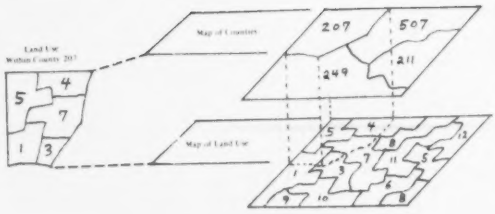
FIGURE 2

COMPOSITE POLYGON MAPPING



Composite File Structure
of Polygon Overlay

Polygon Number	1	2	3	4	5	6	7
Soil Type	1	5	1	3	7	1	6
Vegetation Type	15	11	4	6	11	6	1
Slope Type	1	1	2	1	3	4	5



County 207 Tabular Output

Land Use Class	Acres
5	243
1	170
7	220
4	153
3	52

manuscripts. Polygons, defined as enclosed aerial units of any shape, require considerable computer capacity and memory. Thus increased use of this technique has been a partial function of the significant reductions, in recent years, of costs for the required computer components. The computer hardware currently being employed by the Kentucky GIS consists of a mini computer, disk drives, terminals, and specialized map plotters.

The GIS also stores data in the form of lines, which represent roads, rivers and other linear features, and points, which represent small isolated features such as historic or recreation sites, factories, mines or other unique sites. Economic and demographic data are most commonly stored in polygons which represent political boundaries and census tracts/enumeration districts. Points or line segments can represent unique features within or between the polygons.

The above discussion has briefly described the concept of computer mapping. A more important consideration however, is the application of this technology. The motivating force behind its development has been the increasing interest in performing a broad range of spatial analysis.

One of the more interesting capabilities of GIS systems is the ability to rapidly conduct capability/suitability analysis and to produce unique output in the form of composite maps of identified land areas. This capability requires that the analyst first determine the resource characteristics, or variables, which would produce conditions suitable for the activity being considered and then use the system to spatially model these desired characteritics. The relative importance of each variable can be reflected by assigning weights to the variables and then identifying several levels of projected capability or suitability in the output.

Temporal or time-series modeling can be performed, if appropriate information is available in the data base, and graphics can be produced which illustrate progressive change over time. This capability is enhanced significantly, for some applications, by the availability of LANDSAT satellite data, described below.

Figure 3 illustrates geographic modeling as a tool for resource analysis and regional planning. Potential sites for a hypothetical coal processing concern in Eastern Kentucky have been identified in dark tones on a composite map. The highly simplified suitability model which produced this output used only the variables of slope, land use, soils, and flood plains to predict the best candidate areas for the facility. Economic variables such as labor supply, distance to raw materials, and access to market could be added through gravity modeling to further refine the output. Computer mapping systems are generally interactive and user-efficient to operate. Many alternative models, using different variables and values, can be produced quickly. This iteration capability allows users to test various methodologies on real data and, hopefully, produce unusually high quality products and conclusions.

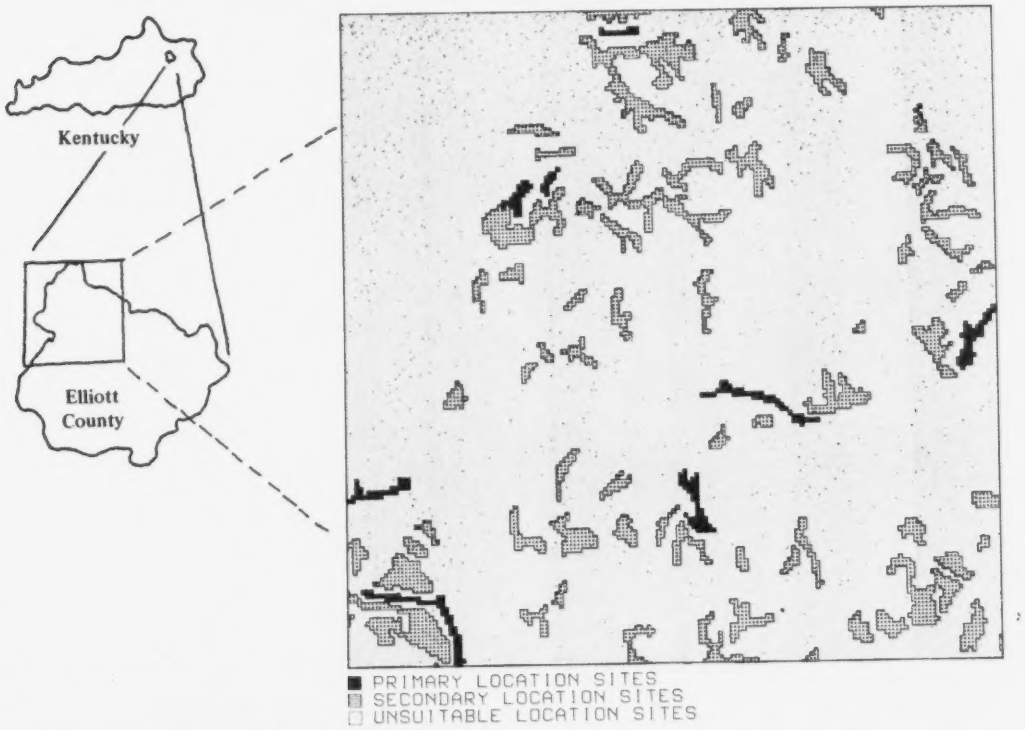
An equally interesting analytical technique of a GIS involves the identification of least cost or least resource/environmental impact corridors between two geographic points. This capability can be used to help site pipelines, transmission lines, roads, or any related linear feature that crosses large areas of land. GIS systems are also commonly programmed to perform several types of aerial data searches which facilitate frequency and proximity analysis along with area and distance calculations. As an example, an inventory of land uses within four miles of a city or river can be quickly produced, along with a statistical summary of the acres covered by each classification.

Perhaps the most visually spectacular feature of a GIS is the ability to produce three dimensional plots of viewsheds from surface locations such as mountain tops and valley floors or from various altitudes and directions above the site. This topographically-oriented capability can also be employed in various watershed analyses, surface calculations and cut/fill analyses. Related three dimensional graphics capabilities are used in various engineering applications.

Contemporary geographic information systems have the capability of storing and manipulating an almost unlimited number of spatial variables. As in most areas of endeavor, the principal constraint is that of economics: the cost of gathering, compiling and entering the data into the system. This constraint is especially severe when employing polygon overlay technology, as in KNRIS, because it needs highly accurate delineations of features and dense graphic data layers. Most

FIGURE 3

PHOTOGRAPHICALLY REDUCED SAMPLE OUTPUT FROM THE KENTUCKY NATURAL RESOURCES INFORMATION SYSTEM (KNRIS): POTENTIAL SITES FOR A HYPOTHETICAL COAL PROCESSING FACILITY IN ELLIOTT COUNTY, KENTUCKY



Multivariable Analysis: USGS Isonville 15 Minute Quadrangle

Variables used in this model include flood prone, land use, slope, and soils. The model searched for non-flood prone areas, rural areas, slope less than 12 percent, and the least severe erodible soil.

relatively mature statewide GIS's, such as in Texas, Minnesota, and Maryland, have encoded three general types of information: 1) physical features–naturally occurring and man-made; 2) socioeconomic–population, income, labor force, etc.; and 3) biological features–terrestrial and aquatic species habitats.

Data base content and structure of a GIS can vary widely according to its major applications. Special-purpose geographic information systems and data bases exist for satellite remote sensing, census data analysis, water pollution planning, and urban planning. Most statewide generic systems, however, follow the broad scheme described above, as does KNRIS. In addition, as a unique data source, KNRIS incorporates a LANDSAT satellite image processing facility capable of interpreting, classifying and cataloging land-cover information over wide geographic areas. This facility will aid in the periodic updating of certain GIS data elements and provides an additional temporal component to the system because of the nine day orbit cycle of existing satellites.

The initial application of this technology in Kentucky is in the Bureau of Surface Mining's Lands Unsuitable for Mining Program; consequently the initial KNRIS data base covers Kentucky's eastern and western coal fields. The data currently stored (or under development) in the system are more oriented toward the naturally occurring than toward the man-made physical features of these regions, which cover approximately 40 percent of the Commonwealth. The GIS data base currently contains east Kentucky coal field data for twelve categories: elevation province, flood prone area, geologic formation, groundwater availability zone, landform, land use, mineral resources (non-coal), physiographic province, slope gradient, soil group, surface configuration, and vegetation type. Similar west Kentucky coal field data are currently being compiled. Among the additional layers of information scheduled for entry within the next year are critical natural areas, roads and rails, census districts and political boundaries.

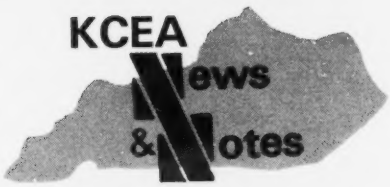
The Kentucky Natural Resources Information System is thus an evolving effort with a broad range of potential future applications for large area planning and analysis efforts. As available resources become more scarce, the utility of such computer-assisted tools should grow significantly for decision makers in the public and private sectors.

Notes

[1]Charles G. Renfro, "An Online Information System for Aggregate State and Local Area Economic Data," *Journal of the American Society for Information Science*, Vol. 31, No. 5, September 1980, pp. 319-333.

[2]Larry J. Salmen, "Natural Resource Analysis Techniques–Their Implications for Data Base Management Systems," *Harvard Papers on Geographic Information Systems*, Volume Two, Cambridge, Mass. Harvard University, 1978.

[3]Devon M. Schneider with Syed Amanullah, "Computer Assisted Land Resource Planning," Planning Advisory Service Report No. 339 Chicago, Ill.: American Planning Association, 1979.



(continued from page 2)

On November 18, 1980 Dr. Charles W. Hultman, Chairman of the KCEA, appeared with Rick Crawford, Kentucky Department for Human Resources, before the Legislative Research Commission's Interim Joint Committee on Labor and Industry to give testimony concerning the unemployment insurance program.

In early December, Dr. Charles G. Renfro, Executive Director of the KCEA, presented testimony before the Kentucky General Assembly Committee for Program Review and Investigation's Seminar on Bonded Indebtedness. Presentations also were made there by George Atkins, Finance Secretary; Robert Warren, Deputy Finance Secretary; R. Scheffel Wright, Legislative Research Commission; Donald Bradshaw, First Kentucky Securities Corporation; and others.

Dr. Renfro spoke to the Cooperative Education Association of Kentucky at its Oktoberfest conference in Louisville on the topic, "Industrial Development of Kentucky and the Economic Outlook" and he presented a special Kentucky Quarterly Model forecast at the 1980 Annual Meeting of the Southeastern Economic Analysis Conference (SEAC), September 25-26, 1980, in Knoxville, Tennessee. This presentation was part of a regional forecast made using econometric models of several southern states including Alabama, Florida, Georgia, Kentucky, Mississippi, and Tennessee and is expected to be repeated annually.

* * *

While awaiting release of the 1980 Census figures, the Urban Studies Center, University of Louisville, together with the Bureau of the Census, U.S. Department of Commerce, has released revised 1978 county-level population figures, along with provisional estimates of 1979 county-level population. These data have been incorporated into and are available from the County Bank (CBANK) of the Kentucky Economic Information System. The 1980 county-level data will be input into the CBANK as soon as they are officially released.

The Bureau of Economic Analysis (BEA) of the U.S. Department of Commerce released the preliminary 1979 and revised 1977 and 1978 disaggregated annual personal income estimates for Kentucky in September 1980. Quarterly personal income estimates through the second quarter, 1980, were released in October 1980, along with revisions in the data beginning with the first quarter, 1977. All of these data have been incorporated into and are available from the KEIS. A summary table of Kentucky personal income for the past five years is given on page 16. A brief article comparing the performance of the Kentucky economy in 1979 with that of the nation and the region follows below.

* * *

The October 1980 issue of *Growth and Change*, a journal of regional development, contains several articles of probable interest to our readers. These include, among others, articles projecting the regional economic impacts of energy development, another on the issue of economic development—a poverty solution for the rural South, and a discussion of the self-employment bias on unemployment rates in metropolitan and nonmetropolitan areas. Subscriptions to *Growth and Change* may be obtained by writing the Associate Editor, 644 Maxwelton Court, Lexington, Kentucky 40506.

Comparative Personal Income 1969 to 1979

PER CAPITA PERSONAL INCOME

	1969	1979	Percent Change 1969-79	1979 Rank in U.S.
United States	$3,667	$8,773	139.2	
Southeast Region	2,981	7,624	155.8	
Alabama	2,695	6,962	158.3	48
Arkansas	2,569	6,933	169.9	49
Florida	3,437	8,546	148.6	26
Georgia	3,096	7,630	146.4	35
KENTUCKY	2,867	7,390	157.8	40
Louisiana	2,839	7,583	167.1	36
Mississippi	2,327	6,178	165.5	50
North Carolina	2,994	7,385	146.7	41
South Carolina	2,748	7,057	156.8	46
Tennessee	2,877	7,343	155.2	43
Virginia	3,400	8,587	152.6	23
West Virginia	2,736	7,372	169.4	42

Personal Income: private and government wage and salary payments in cash and in kind, other labor income, farm and nonfarm proprietors income, personal interest income, rental income of persons, dividends, and transfer payments, less personal contributions for social insurance. It is measured before the deduction of personal income and other personal taxes and is reported in current dollars (no adjustment is made for price changes).

Per capita personal income equals total personal income divided by total population.

In the period from 1969 to 1979 per capita personal income in the United States increased by 139.2 percent. During the same period per capita personal income in the Southeastern region grew by 155.8 percent; Kentucky per capita personal income grew at an even greater rate, 157.8 percent. The growth of per capita personal income in the Southeastern region was the third largest increase among the eight national regions. The largest increases were in the Southwest region, 168 percent, and in the Rocky Mountain region, 156.2 percent.

Although the difference in per capita personal income between the fifty states has narrowed in the 1969-79 period, that of the Southeast region, $7,624, is nonetheless 13 percent below the national average and the lowest among the eight regions. In 1969 per capita personal income in the Southeast was 19 percent below the national average.

Nationwide the percentage increase in per capita personal income was greater than the 84.5 percent national increase in prices 1969-79, as measured by the implicit price deflator for personal consumption expenditures.

The source for all of the above personal income information is U.S. Department of Commerce, Bureau of Economic Analysis, *Commerce News*, September 7, 1980 (BEA 80-55).

—moa—

KENTUCKY ECONOMIC INFORMATION SYSTEM

STANDARDIZED TABLE 1

KENTUCKY ANNUAL ECONOMIC DATABANK

KENTUCKY PERSONAL INCOME: SUMMARY

SERIES		1975	1976	1977	1978	1979
7	INCOME, WAGE & SALARY DISBURSEMENTS, TOTAL, BY PLACE OF WORK	9925.58	11179.35	12517.21	14177.13	15851.40
8	INCOME, OTHER LABOR, BY PLACE OF WORK	1004.06	1236.68	1433.88	1657.13	1882.67
9	INCOME, PROPRIETORS, BY PLACE OF RESIDENCE	1533.27	1687.08	1842.09	1928.40	2230.85
10	INCOME, PROPRIETORS, FARM	465.44	558.02	557.14	517.44	664.89
11	INCOME, PROPRIETORS, NONFARM	1067.83	1129.06	1284.94	1410.96	1565.96
12	INCOME, LABOR & PROPRIETORS, FARM	538.20	659.86	672.89	650.71	784.22
13	INCOME, LABOR & PROPRIETORS, NONFARM, TOTAL	11905.32	13443.26	15120.29	17111.94	19180.70
14	INCOME, LABOR & PROPRIETORS, NONFARM, PRIVATE	9750.62	11052.53	12528.70	14271.33	16047.36
15	INCOME, LABOR & PROPRIETORS, MANUFACTURING, TOTAL	3098.81	3634.73	4161.22	4660.91	5198.04
16	INCOME, LABOR & PROPRIETORS, MANUFACTURING, DURABLE GOODS	1826.42	2171.18	2548.99	2887.87	3230.90
29	INCOME, LABOR & PROPRIETORS, MANUFACTURING, NONDURABLE GOODS	1272.39	1463.55	1612.24	1773.05	1967.14
40	INCOME, LABOR & PROPRIETORS, MINING (SIC 10-14)	969.72	922.17	1141.66	1280.54	1476.36
46	INCOME, LABOR & PROPRIETORS, CONTRACT CONSTRUCTION (SIC 15-17)	723.70	867.71	978.04	1217.28	1338.18
51	INCOME, LABOR & PROPRIETORS, WHOLESALE TRADE (SIC 50-51)	728.20	780.17	829.65	958.45	1073.35
52	INCOME, LABOR & PROPRIETORS, RETAIL TRADE (SIC 52-59)	1221.31	1393.26	1504.78	1714.64	1924.02
61	INCOME, LABOR & PROPRIETORS, FIN., INS., & REAL ESTATE (SIC 60-67)	446.21	530.66	616.07	702.59	790.03
71	INCOME, LABOR & PROPRIETORS, TRANS, COMM. & PUBLIC UTIL (SIC 40-49)	900.68	1026.06	1187.36	1337.92	1530.92
82	INCOME, LABOR & PROPRIETORS, SERVICES (SIC 70-89)	1631.39	1860.92	2068.57	2349.69	2659.36
101	INCOME, LABOR & PROPRIETORS, AG SERV., FORESTRY, FISHERIES, AND OTHER	30.61	36.85	41.34	49.31	57.10
106	INCOME, WAGE & SALARY PLUS OTHER LABOR, GOVERNMENT & GOVT. ENTER.	2174.09	2390.73	2591.59	2840.61	3133.35
6	INCOME, LABOR & PROPRIETORS, TOTAL, BY PLACE OF WORK	12462.92	14103.12	15793.18	17762.66	19964.92
112	INCOME, PERSONAL CONTRIBUTIONS FOR SOCIAL INSURANCE, BY PLACE OF WORK	664.23	722.07	807.47	924.47	1070.51
113	INCOME, RESIDENCE ADJUSTMENT TERM, KENTUCKY PERSONAL INCOME	114.68	88.56	103.45	129.84	135.93
115	INCOME, PROPERTY, DIVIDENDS, INTEREST, RENTS & ROYALTIES, TOTAL	1971.52	2206.73	2522.96	2839.35	3259.31
116	INCOME, TRANSFER PAYMENTS	2652.17	2890.42	3081.92	3289.07	3776.13
1	INCOME, TOTAL KENTUCKY PERSONAL, BY PLACE OF RESIDENCE	16537.06	18566.75	20694.05	23096.45	26065.78
2	INCOME, DISPOSABLE PERSONAL	14387.00	16119.00	17972.00	19814.00	22191.00
3	INCOME, PER CAPITA PERSONAL	4927.61	5404.00	5968.00	6618.00	7390.00
282	INCOME, PER CAPITA DISPOSABLE	4248.00	4692.00	5125.00	5677.00	6292.00
590	POPULATION, TOTAL RESIDENT, AS OF JULY 1	3.39	3.44	3.47	3.49	3.53
4	INCOME, REAL KENTUCKY PERSONAL, IN 1972 DOLLARS	13083.12	13980.99	14739.35	15397.63	15961.90
5	INCOME, REAL DISPOSABLE PERSONAL, IN 1972 DOLLARS	11382.12	12137.80	12658.15	13209.33	13589.10
281	INCOME, REAL PER CAPITA, IN 1972 DOLLARS	3898.43	4069.28	4250.71	4412.00	4525.41
283	INCOME, REAL PER CAPITA, DISPOSABLE PERSONAL, IN 1972 DOLLARS	3360.76	3533.13	3650.28	3784.67	3853.03

UNITS: PER CAPITA AND DISPOSABLE PER CAPITA INCOME IN CURRENT DOLLARS
REAL PER CAPITA AND REAL DISPOSABLE PER CAPITA INCOME IN 1972 DOLLARS
REAL PERSONAL AND REAL DISPOSABLE INCOME IN MILLIONS OF 1972 DOLLARS
POPULATION IN MILLIONS OF PERSONS
ALL OTHER SERIES IN MILLIONS OF CURRENT DOLLARS

SOURCE: U.S. BUREAU OF ECONOMIC ANALYSIS, AUGUST 1980 RELEASE

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KENTUCKY ECONOMY
Review & Perspective

THE KENTUCKY COUNCIL OF ECONOMIC ADVISORS
University of Kentucky, Lexington, Kentucky 40506

March 1981
Vol. 5, No. 1

KCEA Review and Forecast

by Charles W. Hultman*

The general outline and much of the detail of the Reagan Administration economic policies have been enunciated and now await Congressional action. Some of the key economic assumptions made by the Administration regarding these policies include:

	1980	1981	1982	1983
Gross National Product	$2,629 B	$2,920 B	$3,293 B	$3,700 B
Average Consumer Price Rise	13.5%	11.1%	8.3%	6.2%
Average Unemployment Rate	7.2%	7.8%	7.2%	6.6%

Achievement of these changes in 1981 and subsequent years is to be accomplished by a personal income tax reduction spread over a three-year period, a speeding up of depreciation schedules for business plants and equipment, and a decline in most government expenditures, including the wholesale elimination of several large programs. In addition, the Administration seeks to raise funds or realize savings through a return to free market mechanisms, such as usage charges for public goods, the shutting down of unprofitable rail routes, deregulation of energy production. However, a substantial increase in defense spending is anticipated. In general, there would be a restructuring of the federal government's role to the more classic defense, law and order, and emergency activities.

The impact on Kentucky will be evident in a variety of ways. The personal and corporate income tax reductions would be beneficial in terms of generating spending for consumption and investment purposes. Of major importance will be developments relating to interest rates and availability of credit, particularly since they have such an impact on the construction, auto and auto-related industries.

As is well known, Kentucky is a net absorber of federal funds. Although not as dependent in recent years, Kentuckians received $1.12 in federal program expenditures in 1979 for every $1.00 that they sent to Washington. This is somewhat less, for example, than the $1.21 received in 1975. While it is not yet clear whether this ratio will change as a result of new national policies, it is likely that the actual dollars flowing back to the state will decline. The Appalachian Regional Commission, a 15-year old provider of support for economic development in eastern Kentucky may be abolished. Still a relatively poor state, particularly in the eastern part, Kentucky will feel the cuts in human services directly. To the extent that the state government is able to amass the resources and is given the authority to take over many of these social service functions, no long-run real decline in welfare need occur. However, this process of transferring responsibility to states will not happen overnight. Therefore, reductions in federal allocations for CETA, food stamps, education, health and other basic services are certain to adversely affect the state directly (see page 3).

Kentucky's unemployment rate rose to an estimated annual average of 8.1 percent in 1980, well above the national average of 7.1 percent. This development is particularly significant since Kentucky has been characterized as a "recession-proof" state.

The year 1981 began with a monthly unemployment rate in Kentucky in excess of 10 percent—one of the highest rates experienced since the depression of the 1930s and one of the highest in the nation. Although the annual unemployment rate will probably remain somewhat above that of 1980 as a result of new persons entering the labor force, it is expected that the employment situation will improve slightly during the third and fourth quarters of the year as the economy gradually recovers. Of the two major sectors adversely affected by interest rates and credit conditions—the auto-related and construction industries, it is expected that some recovery will occur in the former.

Although the short-term economic prospects for the nation and the state are not highly optimistic, they must be weighed against long-term objectives for the future. The need to regain control over inflationary pressures, to improve productivity and to restore competitive strength in the world economy cannot be overemphasized. Nor is success in these areas likely to be evident in the short run. If the policies of the new Administration are successful, they are likely to reflect the beginning of a new philosophy and era in the U.S. economy.

**Charles W. Hultman is the Chairman of KCEA.*

A new feature, KEISNEWS, has been added to the Frankfort version of the Kentucky Economic Information System (KEIS). KEISNEWS provides a mechanism by which the KCEA staff can communicate online, information about the KEIS on the state government network. The KEISNEWS will be used to announce the revision status of data in the KEIS public databanks, new features of old KEIS programs, and the addition of new data segments or new programs. For example, we expect to be announcing the addition of monthly and quarterly Kentucky Department of Revenue receipts data shortly; the KEISNEWS will carry an announcement of this as soon as the data are accessible. To obtain the KEISNEWS, the user types in the word KEISNEWS at the program choice point of the KEIS Procedure. KEISNEWS has an item menu which allows the choice of all or a portion of the news at any given time.

In response to user requests, Roy Sigafus, staff Senior Scientific Analyst/Programmer, has written yet another variation of Program BEATAB. The output from the new program, called BEATAB2, has the same format as BEATAB. However, instead of information on any two consecutive years, BEATAB2 allows the user to specify any two nonconsecutive years. The output table will have the BEA data for these two nonconsecutive years and will calculate the percentage change between them for each of the items of information included on the table. To access BEATAB2 on the KEIS/Frankfort, the user types in that program name at the program choice point, and responds with the desired years when asked for this information. On the KECNET version of the KEIS, the user must indicate BEATAB2 on the EXEC statement, and on the card (or line) of information with the starting date and county code, the second time period should be entered after the starting date and before the county code, allowing at least a single space between each piece of information.

Another new program now accessible on the KEIS on both the state government and KECNET systems is MODLER, the Modeling Language for Econometric Research. This program is described on pages 10 to 14 following.

* * *

Paul A. Coomes has rejoined the staff of the Kentucky Council of Economic Advisors as Assistant Director for Economic Studies and Analysis. In his new position, Mr. Coomes will work closely with Dr. Charles Renfro on the quarterly and annual Kentucky econometric models and on projects which analyze aspects of the Kentucky economy. Mr. Coomes has previously been Manager of the Kentucky Economic Information System and editor of this quarterly. We are happy to have him on the staff once again.

* * *

Margaret O. Adams, Manager of the Kentucky Economic Information System, will speak on the KEIS as a resource for government, academic, and private sector researchers and libraries at the 2nd National Online Meeting in New York on March 24, 1981. To obtain data for this presentation, she distributed a questionnaire concerning use of the KEIS. The paper which incorporates the responses will be published in the proceedings of the conference. Copies are also available, upon request, from the KCEA office.

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KENTUCKY ECONOMY: Review & Perspective

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Articles submitted for publication should be sent to the Editor at the address given above. All submissions will be reviewed independently by persons recognized as knowledgeable in the specific subject discussed. However, the ultimate responsibility for content rests with the author.

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Kentucky Econometric Model Forecast: Impact Analysis

by Charles G. Renfro and Paul A. Coomes*

For some time now, a forecast made using the Kentucky Quarterly Econometric Model has been a standard feature of each issue of *Review & Perspective.* However, an econometric model can be used not only to make forecasts, but also to provide an assessment of proposed economic policies. Such an assessment is quite simply made: two forecasts are made with the model, one of these a forecast that includes among its assumptions the proposed policy change; the other a forecast that ignores the policy change. A comparison of the forecasts then provides a means of measuring the effect of the policy change.

This quarter, instead of simply presenting a forecast, it may be more appropriate to try to assess the likely effects on Kentucky of the proposed budget cuts recently announced by President Reagan. Kentucky is likely to be disproportionately affected by these cuts, which involve such measures as a substantial cut in various social welfare programs, the end of direct federal funding for synfuels projects in Kentucky, and a possibly significant cut in federal highway development funds available to Kentucky. The proposed federal budget cuts that were announced by President Reagan in late February amount to $34 billion for the United States as a whole.

Charles G. Renfro is the Executive Director of the Kentucky Council of Economic Advisors and Paul A. Coomes is the Assistant Director for Economic Studies and Analysis.

The Office for Policy and Management (OPM) of the Kentucky Department of Finance has estimated the direct impact on Kentucky of the President's budget cut proposals and this information was transmitted to Governor Brown on February 24, 1981.[1] The findings of OPM are summarized in Table 2. The total direct impact on Kentucky during federal fiscal year 1981-82 is estimated to be $335 million dollars. This amount includes a $196 million cut in federal transfer payments to Kentucky residents, a cut of $72 million in federal capital expenditures (including highways), and $67 million in other expenditures. These amounts are estimates of the loss to Kentucky residents, not necessarily estimates of the impact on the Kentucky state government budget; the amounts represent a proposed cut in the flow of income to individuals and organizations, only a portion of which goes to or through state government agencies.

The total impact of the proposed cuts consists of the direct impact plus the second round (or *multiplier*) effects: with less income, less is spent for other goods and services in the state, causing the total impact to be greater than the direct impact. The projected quarter to quarter impact on Kentucky is shown in Table 1. There is both a cumulative effect, as the direct impacts work their way through the economy over time, and an average impact over the period from the fourth quarter of 1981 through the third quarter of 1983. In making the analysis, the budget cuts have been assumed to apply uniformly over the entire two year period. The choice of the fourth quarter 1981 through the third quarter of 1983 reflects the timing of the federal fiscal year.

(continued on page 14)

TABLE 1

ESTIMATED IMPACT OF BUDGET CUTS ON KENTUCKY ECONOMY BY QUARTER
SELECTED ECONOMIC INDICATORS
(Units: Dollars are in Millions; Labor Force Data are in Thousands of Persons)

Description	1981.4	1982.1	1982.2	1982.3	1982.4	1983.1	1983.2	1983.3
Kentucky Personal Income	-338.48	-393.87	-480.17	-525.56	-541.94	-566.90	-587.26	-601.30
Kentucky Real Personal Income	-194.96	-220.66	-262.95	-281.80	-283.29	-288.79	-291.59	-291.32
Disposable Personal Income	-253.86	-292.05	-361.91	-404.93	-428.77	-459.93	-480.72	-493.25
Total Tax and Non-Tax Payments[1]	-82.44	-101.82	-118.22	-120.63	-122.91	-124.04	-124.99	-126.54
State Tax and Non-Tax Payments[1]	-16.18	-19.66	-24.84	-27.36	-28.27	-29.63	-30.58	-31.41
Federal Tax and Non-Tax Payments[1]	-59.51	-71.39	-79.97	-80.71	-85.79	-87.51	-88.88	-90.32
Total Employment[2]	-23.94	-29.66	-34.94	-38.18	-39.23	-39.45	-39.08	-39.12
Non-Agricultural Wage & Salary Employment	-24.01	-29.80	-35.19	-38.49	-39.60	-39.86	-39.51	-39.13
Civilian Labor Force	-23.93	-28.65	-32.87	-35.49	-36.50	-36.97	-37.03	-37.06
Kentucky Unemployment Rate	.09	.18	.27	.33	.36	.32	.29	.27

[1]The tax and non-tax payments included are, for the most part those paid by individuals, not businesses. Furthermore, the changes essentially represent the changes in tax and other government revenues that are directly related to cyclical economic changes.

[2]The apparent contradiction between total employment and non-agricultural wage and salary employment reflects the tendency for some unemployed workers to shift to small farming. It also reflects the methodology used to estimate agricultural employment by the original data source.

TABLE 2

ESTIMATED DIRECT IMPACT OF REAGAN BUDGET BY PROGRAM
FISCAL YEAR 1981-82

President's Proposal by Program	Impact on State Programs/Services	Impact on Other Kentucky Programs
EDUCATION		
Elementary and secondary education programs: reduction	$ 1,200,000	$ 0
Child nutrition program: reduction	0	19,070,000
Federal impact aid funds: elimination	3,000,000	0
Social Security payments to adult students: elimination	0	6,529,000
Student financial aid programs: reduction	0	8,706,000
TRANSPORTATION		
Highway construction funds: reduction	33,000,000	0
Appalachian Regional Commission (ARC), highway construction funds: reduction	33,600,000	0
Highway safety grants: reduction	650,000	1,200,000
Mass transit capital grants: reduction	0	2,700,000
Airport construction funds: reduction	0	1,400,000
HUMAN SERVICES		
Medicaid program: reduction	0	30,000,000
Food Stamp program: reduction	0	42,600,000
Aid to Families with Dependent Children (AFDC): reduction	0	5,600,000
Comprehensive Employment and Training Act (CETA) public service employment: elimination	0	27,544,000
Black Lung Disability Trust Fund benefits: reduction	0	31,374,000
Disability Insurance program: reduction	0	5,000,000
Regulation of health care industry: elimination	0	2,933,000
Health and social service grants: reduction	0	13,087,500
Social Security minimum payments: elimination	0	17,000,000
Unemployment Insurance (UI), extended benefits: reduction	0	12,310,000
DEVELOPMENT		
Appalachian Regional Commission (ARC), non-highway programs: elimination	11,500,000	0
Economic Development Administration (EDA): elimination	450,000	5,485,000
HUD planning assistance (701) program: elimination	650,000	0
Municipal waste treatment funds: reduction	0	1,250,000
Water resource development projects: reduction	0	5,200,000
OTHER		
Dairy price supports: reduction	0	11,000,000
Arts and humanities funding: reduction	0	877,000
Corporation for Public Broadcasting (CPB): reduction	350,000	0
SUMMARY		
Education	4,200,000	34,305,000
Transportation	67,250,000	5,300,000
Human Services	0	187,448,500
Development	12,600,000	11,935,000
Other	350,000	11,877,000
Total	$84,400,000	$250,865,500
Impact on State Programs/Services	$ 84,400,000	
Impact on Other Kentucky Programs	250,865,500	
Grand Total	$335,265,500	

SOURCE: "Estimated Impact of Proposed 1982 Federal Budget Cuts on Kentucky," Office of Policy and Management, Department of Finance, Frankfort, Kentucky, February 24, 1981.

A Review of Economic Aid for Kentucky's Race Track Industry

by Robert R. Sharp*

These are not the best times for horse racing. Nationally the thoroughbred racing industry faces a preponderance of problems. There are charges of race fixing, threatened federal control over medication, increased competition for the gambling and recreational dollar, high taxation, inflation, and more. Industry review of the problems has identified several areas requiring attention: improvements in facilities to attract more patrons; increased security and medication detection procedures to improve racing's public image; greater political support as it relates to tax relief and non-track gambling competition; and improved race track surfaces and construction to minimize injury to horses and jockeys. Solutions to these problems will obviously require investment, and questions arise related to the racing industry's ability to afford them.

Kentucky's four thoroughbred tracks–Churchill Downs, Ellis Park, Keeneland and Latonia–have not been immune to these problems. Thus the purpose of this article is to review the current status of the Kentucky race track industry and to assess the role of the Commonwealth in assisting it. Since such a discussion raises the question of state assistance to private industry, that issue will be addressed as well.

The Thoroughbred Industry is actually a group of industries each producing different, but related goods or services. The primary thoroughbred industries are shown in Table 1. Many

TABLE 1

THOROUGHBRED INDUSTRIES

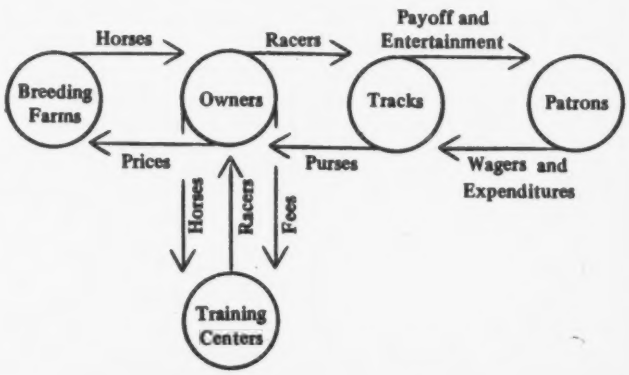
SIC Code	Industry Heading	Thoroughbred Operation Included
0272	Agricultural Production, Livestock Horses and Other Equines	Breeding Farms
0752	Agricultural Services, Animal Services Animal Specialty Services	Training Centers
7948	Services, Amusement and Recreation Commercial Sports: Racing, Including Track Operations	Race Tracks, Racing Stables & Owners

SOURCE: Executive Office of the President, Office of Management and Budget, *Standard Industrial Classification Manual 1972.* Washington, D.C.: Government Printing Office, 1972.

others, including suppliers of insurance, feed, equipment, auction markets, veterinarian services, transportation and more, support the primary industries. The interrelationship of the three primary industries is illustrated in Figure 1. This, of course, is an oversimplification of the flow of dollars and product, and they do not balance. For example, in 1979 there were 63,728 horses racing in North America for total purses of $414,457,431.[1] Using a conservative estimate of $12,000 per year as the cost of keeping a horse in training, total horse training costs for these runners were $764,736,000. While the interrelationship of the thoroughbred industries warrants further study, the focus of this paper, as noted above, is limited to a consideration of racing operations in Kentucky (SIC 7948).

FIGURE 1

SIMPLIFIED PRIMARY INDUSTRIES OF RACING COMPLEX + PATRONS



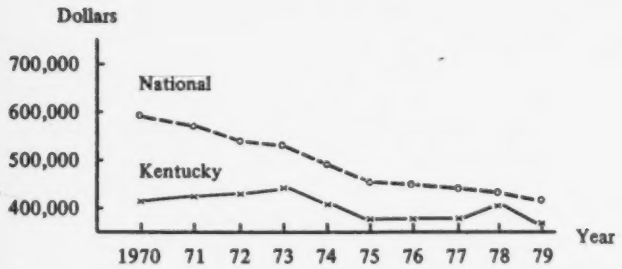
The health of the racing industry is a function of attendance and subsequent expenditures on wagering, food, parking, programs and admissions. Over 70 percent of gross receipts are obtained at most tracks from the dollars wagered, or, the *pari-mutuel handle.*[2] In accordance with state law, Kentucky's racing associations (tracks) deduct a commission from the pari-mutuel handle; the balance of the handle forms the net pool which is redistributed to the winning bettors. The commission is derived from the *take-out rate,* which has been 15 percent in Kentucky for many years. The rates were allowed to rise an additional one to two and one-half percent on single-horse wagering following new legislation in the spring of 1980.[3] Out of the commission, 4.75 cents (per dollar wagered) is paid by the tracks to the state in the form of a *pari-mutuel tax.*[4] The remainder of the commission is shared between the track, which uses these funds to meet expenses (wages and salaries, rent, interest, profit, etc.), and the horsemen, whose share comes in the form of racing purses.

It is clear that monies available for investment in development of the racing industry are a function of the tracks' commissions. Daily average handle for Kentucky tracks and the aggregate of all North American tracks has increased steadily over the ten year period 1970-1979. However, when these statistics are adjusted for inflation using the Consumer Price Index, real average daily handle has actually declined throughout the period (Figure 2). Nevertheless, it is noteworthy that during this period the gap between Kentucky and the nation has narrowed.

Robert R. Sharp is Professor of Economics, College of Business, Eastern Kentucky University, Richmond.

FIGURE 2

DAILY AVERAGE PARI-MUTUEL HANDLE
(Constant 1967 Dollars)

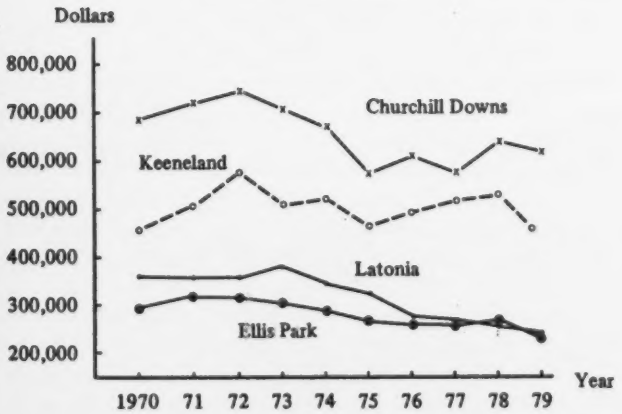


SOURCE: Kentucky State Racing Commission, *Biennial Report Presented to the Governor and the General Assembly*, 1970-1979 and "Racing and Economics: Part I," *The Blood-Horse*, June 28, 1980, p. 3323.

The inflation adjusted statistics for Kentucky's four thoroughbred tracks are shown in Figure 3. For Keeneland, the trend line is nearly horizontal, as is true for Churchill Downs after 1974. But the decline appears persistent at Ellis Park and Latonia. It would appear then that the size of the commission in Kentucky was not likely to provide significant increases in investment dollars.

FIGURE 3

DAILY AVERAGE PARI-MUTUEL HANDLE
(Constant 1967 Dollars)



SOURCE: Kentucky State Racing Commission, *Biennial Report Presented to the Governor and the General Assembly*, 1970-1979.

Among the suggested alternatives for increasing track investment monies is raising the take-out rate. However, several studies of racing question the feasibility of doing this by suggesting that the price elasticity of demand for pari-mutuel wagering is elastic.[5] In other words, because raising the take-out rate lowers the pool of money redistributed to winning bettors, a more than proportional decline occurs in the amount wagered, and a smaller commission results. These findings are of particular interest to Kentucky's four tracks because they are allowed by 1980 legislation to raise their commissions somewhat, as noted above. In amending the bill which raised the general take-out rates, the legislature stipulated that an additional one-half percent was to be added to the take-out rate at Latonia and Ellis Park to finance a backside (stable area) improvement fund. Hopefully, the price-elasticity of demand for wagering at these two tracks will prove to be inelastic, i.e., different from the results reported above.

Economically speaking, one should invest where the multiplier effects are the greatest. Some light may be cast on this issue from results reported in the Pugh-Roberts study commissioned by The Jockey Club in 1974. According to this study, fans are sensitive to the quality of racing, but, "the largest payoff in terms of attracting new fans comes from investment in improved track facilities." Financing such investment by raising the take-out rate may not be productive since beyond the immediate period of the commission increase, the industry would receive a larger share of a considerably smaller handle. The Pugh-Roberts study found that facilities' improvements financed from a higher take-out produced only modest results.[6]

Another alternative for increasing the monies available for investment is redistribution of the existing commission. Since 1970, the pari-mutuel tax in Kentucky has remained 4.75 cents of each dollar wagered, or about 32 percent of the commission. Another large portion of the commission has been allocated to the purses. As shown in Table 2, association-provided purses, as a proportion of the commission, have grown in Kentucky from 33 percent to 38 percent in the same period. The figures for the nation, and Oaklawn Park, a very successful racing operation in Arkansas, are also shown. It should be noted that the figures for Keeneland are somewhat nonrepresentative because the Keeneland Association is a non-profit corporation (stockholders do not receive dividends) and it operates both racing and sales divisions.

TABLE 2

ASSOCIATION-PROVIDED PURSES AS A PERCENTAGE OF THE PARI-MUTUEL COMMISSION, 1970 AND 1979*

Tracks	1970 (Percent)	1979 (Percent)
United States, Total	–	30
Kentucky, Total	33	38
Churchill Downs	29	36
Ellis Park	32	35
Keeneland	46	49
Latonia	31	35
Oaklawn Park (Arkansas)	–	32

*Association-provided purses equals total purse distribution less horsemen purse contributions and less contributions from the Kentucky Thoroughbred Development Fund.

SOURCE: Kentucky State Racing Commission, *The Biennial Report Presented to the Governor and General Assembly*, 1970-1979; and "Racing and Economics: Part I," *The Blood-Horse*, June 28, 1980, p. 3323.

The rationale for devoting greater amounts to purses is to improve the quality of racing and thereby to attract more patrons. The dilemma, however, is that in the short run, increasing the purse inevitably means fewer funds for track improvements, also a significant factor affecting track attend-

ance. The data reported in Table 2 suggest that larger purse monies in Kentucky have been at the expense of the racing associations' share of the commission. In any case, from these figures it would seem unlikely that the Kentucky tracks will redistribute an even greater proportion of their share of the commission to purses.

Currently, three-quarters of one percent of the total pari-mutuel handle (3/19 of the state's pari-mutuel tax) is allocated to the Kentucky Thoroughbred Development Fund. This fund was legislatively created in 1978 to provide supplemental purses for designated stakes, handicaps, allowances and non-claiming maiden races in Kentucky for registered Kentucky-sired Kentucky-breds. The significant aspect of the Thoroughbred Development Fund is that since it is generated from pari-mutuel tax receipts it is neither an increase in the commission nor a decrease in the track's share of the commission. It is, in effect, tax relief.

Nonetheless, racing associations are heavily taxed. In addition to the pari-mutuel tax there are income taxes, daily license fees, admissions tax, license fees for all race track personnel, and more. It appears that legislative support for racing has historically been geared to the amount of tax monies generated by wagering. Little attention appears to have been focused on the benefits to the state economy from the income generated by employment and production in the horse industries. For example, in addition to the $10,174,992 received by Kentucky state government in 1978 from the pari-mutuel tax, $4,554,384 more was received in other taxes from track association revenues. Further, an indeterminate amount of income was generated, and taxes paid, by horsemen, sales companies, feed suppliers, horse carriers, bloodstock and insurance agencies, property owners, tourist expenditures, veterinarian services, etc.

Based on revisions of earlier studies, the author has estimated that wages paid in 1978 to employees of thoroughbred-related businesses in the United States was about $1.25 billion. Estimates of the stock of capital investment in the thoroughbred industries for the same time period and coverage was about $6.9 billion. These figures do not include all support industries nor do they consider the multiplier effects resulting from receipt and respending of these amounts. The expenditures of tourists and out-of-town racing patrons attracted to horse activity centers are also omitted. These numbers can be contrasted against the amount of pari-mutuel tax revenue received by the thoroughbred racing states in 1978 of less than $500 million.

A major difficulty which arises from emphasizing racing as a generator of pari-mutuel tax revenue for states is that, in the long run, such short-run objectives may erode the base of the revenue. The objectives of the states are not necessarily compatible with the objectives of the racing associations. It would appear that states' objectives have historically been to maximize pari-mutuel revenue. Tracks' objectives are to maximize long-run net profits.

An obvious example of the implication of these divergent goals derives from the nature of pari-mutuel demand being less than perfectly elastic. Racing associations potentially have some degree of monopoly power as they are licensed as the only suppliers of legal pari-mutuel wagering. As such, and in the absence of state prescribed take-out rates, the profit maximizing racing association would set a take-out rate for pari-mutuel betting which would produce less than the revenue-maximizing volume of income. The state prescribed rate, given the objective of maximizing revenue, would be set lower than the profit-maximizing rate. The possibility, assuming the validity of studies showing demand to be elastic at current take-out rates, is that in some states the take-out rates are neither conducive to profit maximization nor revenue maximization. This raises the question of which goal is best for racing, given the current environment.

A not so obvious example of the implication of the divergent goals is based on evidence that increased racing days per marketing area can saturate the patron demand and reduce average daily handle.[7] Reduced average daily handle is detrimental to the profit-maximizer but, so long as total revenue increases, is, in the short run, favorable to the revenue maximizer. In the long run, however, lower profits can lead to deterioration of facilities, lower real purses, and a weakened revenue base.

The potential economic inefficiencies of monopoly type firms justifies their regulation as pertains to net profits and supply. In the case of most racing associations today, including at least two Kentucky tracks, neither abnormally high profit levels nor restricted supply appear to be present. Efforts to locate and operate at the profit-maximizing take-out rate would seem to be productive in rebuilding the revenue base. Lowering the take-out rate to maximize revenue or raising it, if the price elasticity of demand is inelastic, will not maximize profits. Only in the unlikely situation that the costs of doing additional business were zero (marginal costs equal zero) would maximum profits occur where maximum revenue occurs. It is more likely that the take-out rate to maximize profits would be greater than the take-out rate that maximizes total revenue.

Once this distinction is made, a number of options exist whereby take-out rate related policies may be used to assist tracks. Among the options for the state are to: 1) maximize total revenue but give tracks a greater share; 2) permit tracks to maximize profits and give them a greater share; or, 3) simply permit tracks to maximize profits. With any of these options the state could specify the proportion of the profits that the tracks must use to improve facilities. Of course, the implications of each option would need to be evaluated in light of a specified goal.

It is probable that the elasticity characteristics of pari-mutuel demand are different in different market areas and for various levels of demand within the same marketing area. This suggests that take-out rates should be determined on a track by track basis and, further, that graduated take-out rates be used at a given track. The use of graduated rates is currently practiced in some racing states.

In summary, tax relief and take-out rate adjustments could provide additional monies for upgrading track facilities which would in turn attract more patrons. This would provide higher purses and thus attract quality horses. Studies need to be undertaken to determine the characteristics of pari-mutuel demand and costs for Kentucky tracks in order to guide such policies in the desired direction. Even allowing for these improvements, there is evidence that racing associations must

(continued on page 15)

selected indicators OF ECONOMIC A

These tables of selected indicators of economic activity were prepared by a special-purpose program of the Kentucky Economic Information System. The data in the tables are reported figures which were obtained from a variety of state and federal agencies, as well as from private firms.

UNITED STATES DATA

	Oct. 1980	Nov. 1980	Dec. 1980	Qtr. IV 1980	% Chg. 80-III 80-IV	% Chg. 79-IV 80-IV
CONSUMER PRICE INDEXES (1967=100, NOT SEASONALLY ADJUSTED)						
CONSUMER PRICE INDEX, ALL URBAN CONSUMERS (CPI-U), ALL ITEMS	253.90	256.20	258.40	[illegible]	3.01	12.54
CONSUMER PRICE INDEX, ALL URBAN CONSUMERS (CPI-U), FOOD AND BEVER	255.50	257.40	259.30	[illegible]	2.35	10.20
CONSUMER PRICE INDEX, ALL URBAN CONSUMERS (CPI-U), HOUSING	271.10	273.80	276.90	[illegible]	2.91	13.81
CONSUMER PRICE INDEX, ALL URBAN CONSUMERS (CPI-U), APPAR & UPKEEP	183.90	184.80	183.90	[illegible]	2.91	7.32
CONSUMER PRICE INDEX, ALL URBAN CONSUMERS (CPI-U), TRANSPORTATION	256.10	259.00	261.10	[illegible]	2.35	14.94
CONSUMER PRICE INDEX, ALL URBAN CONSUMERS (CPI-U), MEDICAL	272.80	274.50	275.80	[illegible]	2.17	10.54
CONSUMER PRICE INDEX, ALL URBAN CONSUMERS (CPI-U), ENTERTAINMENT	210.90	211.20	212.00	[illegible]	1.55	9.67
CONSUMER PRICE INDEX, ALL URBAN CONSUMERS (CPI-U), OTHER	221.50	222.60	224.60	[illegible]	3.13	9.80
CONSUMER PRICE INDEX (CPI-U), SPECIAL INDEX: ENERGY	368.00	366.10	370.40	[illegible]	-0.60	18.89
PRODUCER PRICE INDEXES (1967=100, NOT SEASONALLY ADJUSTED)						
PRODUCER PRICE INDEX, ALL FINISHED GOODS	252.20	253.20	256.90	[illegible]	1.97	12.28
PRODUCER PRICE INDEX, FINISHED CONSUMER GOODS	253.60	254.70	258.60	[illegible]	1.50	12.37
PRODUCER PRICE INDEX, INTERMEDIATE MATERIALS	286.30	288.00	291.70	[illegible]	1.87	12.10
PRODUCER PRICE INDEX, INTERMEDIATE MATERIALS FOR MANUFACTURING	271.80	273.10	275.50	[illegible]	2.10	11.23
PRODUCER PRICE INDEX, CRUDE MATERIALS	336.00	337.60	320.80	[illegible]	3.05	11.16
PRODUCER PRICE INDEX, CRUDE FOODSTUFFS AND FEEDSTUFFS	279.10	277.30	271.60	[illegible]	1.37	11.35
PRODUCER PRICE INDEX, BITUM. COAL, INDUSTRIAL,SPOT(1967=100)	399.30	396.40	396.40	[illegible]	0.13	0.83
PRODUCER PRICE INDEX, BITUM. COAL, INDUSTRIAL,CONTRACT(JUNE76=100)	133.40	135.30	135.20	[illegible]	1.08	4.42
CONSUMER PRICES: ENERGY (U.S. CITY AVERAGE)						
AVG PRICE FOR UTILITY (PIPED) GAS, PER 40 THERMS	17.59	17.43	17.70	[illegible]	1.55	12.89
AVG PRICE FOR UTILITY (PIPED) GAS, PER 100 THERMS	41.39	38.99	39.70	[illegible]	-1.66	15.93
AVG PRICE FOR ELECTRICITY, PER 500 KWH	30.89	30.38	30.97	[illegible]	-2.74	17.32
AVG PRICE FOR FUEL OIL #2 (HOME HEATING OIL), PER GALLON	1.01	1.02	1.07	[illegible]	1.37	19.11
AVG PRICE, GASOLINE, ALL TYPES, PER GALLON	1.22	1.22	1.23	[illegible]	-1.21	19.86
AVG PRICE, GASOLINE, LEADED REGULAR, PER GALLON	1.19	1.19	1.20	[illegible]	-1.38	19.34
AVG PRICE, GASOLINE, UNLEADED REGULAR, PER GALLON	1.25	1.25	1.26	[illegible]	-0.98	19.91
AVG PRICE, GASOLINE, LEADED PREMIUM, PER GALLON	1.30	1.30	1.31	[illegible]	-0.28	22.88
LABOR FORCE (SEASONALLY ADJUSTED)						
LABOR FORCE, CIVILIAN (MILLIONS)	105.17	105.28	105.07	[illegible]	0.18	1.38
EMPLOYMENT, TOTAL (MILLIONS)	97.21	97.34	97.28	[illegible]	0.22	-0.30
EMPLOYMENT, AGRICULTURE	3.32	3.34	3.39	[illegible]	1.79	0.71
EMPLOYMENT, NONAGRICULTURAL INDUSTRIES	93.89	94.00	93.89	[illegible]	0.17	-0.34
UNEMPLOYMENT RATE, TOTAL	7.60	7.50	7.40	[illegible]	-0.44	26.40
UNEMPLOYMENT RATE, BLACKS & OTHER RACIAL MINORITIES	14.20	14.00	14.00	[illegible]	1.20	24.48
OTHER SELECTED NATIONAL INDICATORS:						
U.S. GROSS NATIONAL PRODUCT ($ $) (% CHG AT ANNUAL RATE)	NA	NA	NA	[illegible]	15.21	9.45
U.S. REAL GROSS NATIONAL PRODUCT ($ 72$) (% CHG AT ANNUAL RATE)	NA	NA	NA	[illegible]	4.03	-0.28
PERSONAL INCOME, TOTAL, SEASONALLY ADJUSTED ($ $)	2234.20	2257.10	2276.80	[illegible]	14.25	11.03
COMPOSITE INDEX OF 12 LEADING INDICATORS (1967=100)	136.10	137.60	136.40	[illegible]	3.93	0.37
INDEX OF INDUSTRIAL PRODUCTION, SEASONALLY ADJUSTED (1967=100)	146.90	149.40	150.90	[illegible]	4.90	-2.25
INTEREST RATE, YIELD ON 3-MONTH TREASURY BILLS	11.58	13.89	15.66	[illegible]	48.44	20.53
PRIVATE RESIDENTIAL BLDG. 16000 PERMIT ISSUING PLACES (SADJ THOU)	1333.00	1355.00	1235.00	[illegible]	-20.99	-2.22
TOTAL INSTALLMENT CREDIT OUTSTANDING AT END OF MONTH ($ $)	305.45	304.86	306.47	[illegible]	0.78	-0.78

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KENTUCKY DATA

	Oct. 1980	Nov. 1980	Dec. 1980	Qtr. IV 1980	% Chg. 80-III 80-IV	% Chg. 79-IV 80-IV
LABOR FORCE (NOT SEASONALLY ADJUSTED, THOUSANDS)						
LABOR FORCE, TOTAL CIVILIAN	1646.74	1626.40	1609.02	1627.39	-1.06	2.26
EMPLOYMENT, TOTAL, BY PLACE OF RESIDENCE	1519.26	1507.35	1487.26	1504.62	0.10	0.04
EMPLOYMENT, AGRICULTURAL	88.80	72.80	56.80	72.80	-9.53	-2.28
EMPLOYMENT, TOTAL NON-AGRICULTURAL	1430.46	1434.55	1430.46	1431.82	0.65	0.17
UNEMPLOYMENT RATE	7.70	7.30	7.60	7.53	-12.51	37.21
EMPLOYMENT, TOTAL NON-AGRICULTURAL WAGE AND SALARY	1214.60	1223.30	1222.30	1220.07	1.64	-3.15
EMPLOYMENT, BITUMINOUS COAL & LIGNITE MINING (SIC 12)	47.10	47.60	47.20	47.30	-0.84	-5.21
EMPLOYMENT, CONTRACT CONSTRUCTION	62.70	60.80	57.90	60.47	-3.82	-12.58
EMPLOYMENT, TOTAL MANUFACTURING	269.30	273.30	273.80	272.13	1.40	-7.47
EMPLOYMENT, MANUFACTURING, DURABLE	151.00	152.10	151.60	151.57	1.50	-10.12
EMPLOYMENT, MANUFACTURING, NON-DURABLE	118.30	121.20	122.20	120.57	1.29	-3.91
EMPLOYMENT, TRANSPORTATION, COMMUNICATIONS & PUBLIC UTILITIES	68.80	68.70	68.70	68.73	0.00	-3.41
EMPLOYMENT, WHOLESALE & RETAIL TRADE	260.10	266.00	270.80	265.63	3.17	-2.78
EMPLOYMENT, FINANCE, INSURANCE & REAL ESTATE (SIC 60-67)	52.10	51.90	52.00	52.00	-0.89	0.06
EMPLOYMENT, SERVICES (SIC 70-80)	212.60	212.50	209.60	211.57	0.59	1.96
EMPLOYMENT, CIVILIAN GOVERNMENT	236.80	237.70	237.70	237.40	4.52	-0.21
EMPLOYMENT, STATE & LOCAL GOVERNMENT	192.70	193.20	193.70	193.20	6.72	-3.40
HOURS AND EARNINGS OF PRODUCTION WORKERS IN MANUFACTURING						
AVG WEEKLY HOURS, PROD WORKERS, TOTAL MANUFACTURING	39.80	40.30	41.00	40.37	5.12	1.17
AVG WEEKLY HOURS, PROD WORKERS, MANUFACTURING DURABLES	40.10	40.60	41.50	40.73	6.63	0.58
AVG WEEKLY HOURS, PROD WORKERS, NON-DURABLE MANUFACTURING	39.60	39.80	40.40	39.93	3.19	2.04
AVG HOURLY EARN, PROD WORKERS, TOTAL MANUFACTURING	7.64	7.70	7.64	7.66	3.10	10.43
AVG HOURLY EARN, PROD WORKERS, MANUFACTURING DURABLES	8.16	8.24	8.24	8.21	2.84	11.49
AVG HOURLY EARN, PROD WORKERS, NON-DURABLE MANUFACTURING	6.98	7.01	6.88	6.96	3.06	9.10
AVG WEEKLY EARN, PROD WORKERS, TOTAL MANUFACTURING	304.07	310.31	313.24	309.21	8.36	11.72
AVG WEEKLY EARN, PROD WORKERS, MANUFACTURING DURABLES	327.22	334.54	341.96	334.57	9.64	12.14
AVG WEEKLY EARN, PROD WORKERS, NON-DURABLE MANUFACTURING	276.41	279.00	277.95	277.79	6.34	11.32
INDEX OF PRICES RECEIVED BY KY FARMERS (1972=100)						
INDEX OF PRICES REC'D BY KY FARMERS, CROP AND LIVESTOCK PRODUCTS	171.75	184.66	183.50	179.97	5.47	4.71
INDEX OF PRICES REC'D BY KY FARMERS, LIVESTOCK PRODUCTS	170.33	166.22	163.43	166.66	-0.61	-2.35
INDEX OF PRICES REC'D BY KY FARMERS, CROPS	172.65	196.24	196.08	188.32	9.19	9.11
MINING (MILLIONS OF TONS, MILLIONS OF TAX DOLLARS)						
BITUMINOUS COAL & LIGNITE, PHYSICAL OUTPUT, EASTERN KY, TOTAL	8.95	9.15	8.94	27.04	7.79	-7.21
BITUMINOUS COAL & LIGNITE, PHYSICAL OUTPUT, WESTERN KY, TOTAL	2.99	3.19	3.35	9.53	2.83	-25.13
AVG HOURLY EARN, PROD WORKERS, BITUMINOUS COAL & LIGNITE MINING	11.08	11.45	11.42	11.32	1.04	5.47
AVG WEEKLY EARN, PROD WORKERS, BITUMINOUS COAL & LIGNITE MINING	445.42	477.47	475.07	465.99	10.40	6.73
AVG WEEKLY HOURS, PROD WORKERS, BITUMINOUS COAL & LIGNITE MINING	40.20	41.70	41.60	41.17	9.10	1.15
TAX RECEIPTS, COAL SEVERANCE, CONSOLIDATED, TOTAL	16.38	3.69	25.77	45.84	*	10.02
CONSTRUCTION (MILLIONS OF $, NO. OF PRIVATE RESID. UNITS--NOT SEAS ADJ)						
VALUE OF CONSTRUCTION CONTRACTS, RESIDENTIAL & NON-RES	198.00	141.80	152.40	164.07	2.84	28.20
PERMIT AUTHORIZED CONSTRUCTION, NO. OF 1-FAMILY RESID. UNITS	635.00	366.00	353.00	1354.00	-36.34	-11.04
VALUE OF PERMIT AUTHORIZED CONSTRUCTION, 1-FAMILY RESID. UNITS	28.50	18.41	14.59	61.50	-33.50	-0.20
PERMIT AUTHORIZED CONSTRUCTION, NO. OF RESID. UNITS, TOTAL	898.00	665.00	613.00	2176.00	-36.73	-23.46
VALUE OF PERMIT AUTHORIZED CONSTRUCTION, ALL RESID. UNITS, TOTAL	34.13	28.26	22.98	85.37	-29.79	0.96
RETAIL SALES (000$, 000 CARS)						
TAX RECEIPTS, GENERAL FUND, SALES AND GROSS RECEIPTS	66541.44	58906.78	57720.13	183168.35	*	0.73
NEW PASSENGER CAR REGISTRATIONS, TOTAL, NOT SEAS. ADJ.	0.00	31.76	13.46	45.22	*	33.48
FINANCE AND INSURANCE (MILLIONS OF DOLLARS)						
NET LOANS MADE & ACQUIRED BY KY. SAVINGS & LOAN ASSOCIATIONS	87.49	50.42	46.25	184.16	-0.18	28.75
SALES OF ORDINARY LIFE INSURANCE	406.93	350.32	410.17	1167.42	7.19	0.69
SELECTED STATE GOVERNMENT RECEIPTS						
TAX AND NONTAX RECEIPTS, GENERAL FUND, TOTAL (MIL $)	143.68	158.55	191.06	493.29	*	3.72
TAX RECEIPTS, GENERAL FUND, SALES & USE TAXES, TOTAL (THOU $)	52370.13	55070.61	53717.93	161158.67	*	0.30
TAX RECEIPTS, GENERAL FUND, INCOME TAX, INDIVIDUAL (THOU $)	36608.27	61621.11	40283.57	138512.95	*	-8.79
TAX RECEIPTS, GENERAL FUND, INCOME TAX, CORPORATION (THOU $)	10524.03	3783.65	25265.93	39573.61	*	12.44
TAX RECEIPTS, STATE ROAD FUND, STATE SHARE (THOU $)	29149.95	14409.30	47476.21	91035.46	*	-15.29
TAX RECEIPTS, STATE ROAD FUND, MOTOR FUELS NORMAL, TOTAL (THOU $)	19169.91	7626.64	24047.25	50843.80	*	9.38
TAX RECEIPTS, STATE ROAD FUND, MOTOR VEHICLE USAGE TAX (THOU $)	8229.60	5712.89	7747.00	21689.49	*	-9.94

PRIVATE SOURCES FOR THE ABOVE DATA INCLUDE:
F. W. DODGE DIVISION (MCGRAW-HILL INFORMATION SYSTEMS COMPANY),
VALUE OF CONSTRUCTION CONTRACTS;
LIFE INSURANCE MARKETING & RESEARCH ASSOCIATION,
SALES OF ORDINARY LIFE INSURANCE;
R. L. POLK & COMPANY, NEW CAR REGISTRATIONS

PLEASE NOTE: NO NEW CAR REGISTRATIONS WERE REPORTED IN OCTOBER;
NOVEMBER DATA REFLECT REPORTED REGISTRATIONS FOR BOTH MONTHS.

* = QUARTER TO QUARTER COMPARISONS NOT MEANINGFUL DUE TO SEASONAL VARIATION

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MODLER: The Modeling Language for Econometric Research

by Charles G. Renfro*

The MODLER program is a general purpose econometric software package that is now available as part of the Kentucky Economic Information System.[1] This program takes its name from the fact that its commands comprise a free-format verbal-mathematical language that is designed to allow its users to construct, maintain, and solve econometric models. These models can range in size from a few equations to several hundred. They can be linear or nonlinear in form and recursive or nonrecursive in structure.

The program is integrated into KEIS inasmuch as it directly accesses all the Public banks and can be used with any Private or Agency bank created using KEIS software. However, it can also be viewed as constituting an extension of the features of several other KEIS programs. It provides all the data transformation features of DTP and the plotting capabilities of DTPPLOT. It offers all the regression facilities of both the Ordinary Least Squares regression program OLS and the much more sophisticated Generalized Least Squares program GLS. In addition, it allows the user to define a particular group of linear or nonlinear equations as a model and permits that model to be saved, printed and then used to make forecasts or simulations. These are some of the characteristics of MODLER.

As this description implies, MODLER is intended for use by econometricians. However, it has been designed to be used also by other people. Someone familiar with DTP will find MODLER quite easy to use. In terms of command structure, the most noticeable difference between DTP and MODLER is that a MODLER command may refer either to a single executable command (for example, an ordinary transformation such as Z = X/Y) or to a group of commands that are to be executed together (for example, a model, which is essentially a group of equations). A consequence of this difference is that MODLER incorporates an editing sub-language to permit models and other group commands to be defined and then, if necessary, later revised or extended. In contrast, the only command editing feature of DTP is the CHANGE command that is used to correct command syntax errors when this program is operated interactively.

It is with respect to its parameter estimating capabilities that MODLER extends the features of OLS and GLS. These programs, used interactively on the state government network, permit regression equations to be saved ("SPOOLED") for later printing on some hard-copy printing device. MODLER incorporates this capability, but it also allows estimated equations to be saved for later inclusion in an econometric model. Once a model has been created, MODLER additionally allows equations to be included immediately after estimation, either as additional equations or as replacements for other equations. A further, related feature is the ability to use MODLER to print all the equations of a model, including associated regression statistics, such as parameter t-statistics, R^2, and the Durbin-Watson statistic for each estimated equation.

There is a further sense in which MODLER is to be regarded as being an extension of these other programs, which is that it involves the same commands in order to perform identical operations; using MODLER instead of DTP, OLS or GLS involves learning additional commands for new operations, not a change of commands. Instead of thinking of MODLER as an extension, these other programs alternatively can be thought of as offering selected features of MODLER.

These introductory paragraphs have stressed the relationship between MODLER and several other, more familiar KEIS programs, lest this program be thought to be both new and difficult to learn to use. However, in order to introduce MODLER, it may be helpful to provide an extended example of its use. An econometric model that is widely used as a teaching example is the simple demonstration model created in 1950 by Professor L. R. Klein, known as Klein Model I.[2] In standard mathematical notation it is given by:

$$C_t = \alpha_0 + \alpha_1 P_t + \alpha_2 P_{t-1} + \alpha_3 (W_1+W_2)_t + u_{1t}$$

$$I_t = \beta_0 + \beta_1 P_t + \beta_2 P_{t-1} + \beta_3 K_{t-1} + u_{2t}$$

$$W_{1t} = \gamma_0 + \gamma_1 (Y+T-W_2)_t + \gamma_2 (Y+T-W_2)_{t-1} + \gamma_3 (t-1931) + u_{3t}$$

$$Y = C + I + G - T$$

$$P = Y - (W_1 + W_2)$$

$$K_t - K_{t-1} = I_t$$

Where:
- C = Personal Consumption Expenditures
- P = Non-wage Income
- W_1 = Private Wage Bill
- W_2 = Government Wage Bill
- I = Net Private Domestic Investment
- K = Capital Stock
- Y = Net National Income
- T = Indirect Business Taxes
- G = Government Purchases of Goods and Services
- t = time; t = 1920, 1921, 1922, ...

with all variables, except time, expressed in billions of 1934 dollars.[3]

The first few commands of MODLER that are executed in creating a working example of the Klein Model are identical to the commands used in DTP, OLS or GLS.[4] It is first necessary to identify the data bank from which the data used to estimate the model will be retrieved. It is also necessary to define the sample period, using a SET DATES command, and the frequency of the data, using a SET FREQUENCY command. The initial three commands are:

```
INPUT BANK=DEMOBANK
SET FREQUENCY=ANNUAL
SET DATES=1920-1941
```

I am indebted to Paul A. Coomes for his assistance in setting up the sample run of Professor Klein's model.

These are followed by the commands to retrieve particular data series from the bank:

```
JOBTITLE: DEMONSTRATION OF MODLER
FETCH:CE=CEK34(1)
FETCH:Y=YNK34(5)
FETCH:W1=WBCPK34(10)
FETCH:W2=WBCGVK34(11)
FETCH:P=PRK34(8)
FETCH:I=IBNK34(2)
FETCH:K=KIK34(7)
FETCH:NNP=NNPK34(4)
FETCH:G=GVXK34(3)
```

The notation CE is used for consumption expenditures, rather than C, because MODLER interprets C as indicating a parameter. NNP is Net National Product; NNP = Y + T.

Since the model also uses several transformed variables, these need to be constructed next:

```
T=NNP-Y
W=W1+W2
PLAG1=LAG(1,P)
KLAG1=LAG(1,K)
NPP=NNP-W2
NPPLAG1=LAG(1,NPP)
TIME=TIME(1920,1920)
T1931=TIME-1931
```

Having fetched data and created the necessary transformed variables, the next task is to specify the regression equations. The regression commands are:

```
CE=F(P,W)
SAVE EQUATION AS EQ#1
I=F(P,PLAG1,KLAG1)
SAVE EQUATION AS EQ#2
W1=F(NPP,NPPLAG1,T1931)
SAVE EQUATION AS EQ#3
```

including the commands to save the regression results for use in the model.

Next, the model is created using the editing sub-language of MODLER. In the case of a new model, this sub-language is entered using the DEFINE MODEL command:

```
DEFINE MODEL:NAME=KLEIN#1, DESC:KLEIN MODEL ONE
MODEL FREQUENCY=ANNUAL
INCLUDE REGEQ#1
INCLUDE REGEQ#2
INCLUDE REGEQ#3
Y=CE+I+G-T
P=Y-(W1+W2)
K=I+LAG(1,K)
MODEL DEFINED, SAVE, PRINT
```

These commands cause the model to be created, saved, and printed, as the accompanying figures illustrate; see, in particular, Figure 4.

However, before the model can be used to make forecasts or simulations, it is necessary to make a few editorial changes. In the case of an existing model, the editing sub-language is entered using the EDIT command:

```
EDIT KLEIN#1
FIND MEQ#1
C/W/(W1+W2)/
FILE
FIND MEQ#2
C/PLAG1/LAG(1,P)/
C/KLAG1/LAG(1,K)/
FILE
FIND MEQ#3
C/NPP/(Y+T-W2)/
C/NPPLAG1/(LAG(1,Y)+LAG(1,T)-LAG(1,W2))/
FILE
SAVE, PRINT
```

The output that is generated by the commands given so far is shown in Figures 1-5. The effect of the last, editing, step can be seen by comparing Figures 4 and 5; the actual responses to each of the individual edit commands are not shown. Anyone with access to the KEIS can generate the full output by issuing the above MODLER commands exactly as shown; however, see footnote 4.

FIGURE 1

DATA RETRIEVAL

```
CHARACTERISTICS OF INPUT BANK:
     BANK DESCRIPTION: KEIS DEMONSTRATION BANK
     NUMBER OF SERIES IN BANK:   10
     BANK LAST UPDATED AT 17:13:18 ON 10 MAR 1981
FREQUENCY SET.
     PROGRAM NOW EXPECTS DATA THAT HAS A FREQUENCY OF 1
     OBSERVATION PER YEAR

DATES SET.  PERIOD IS:   1920-  1941
JOBTITLE:  DEMONSTRATION OF MODLER
MEMORY FILE CREATION DETAILS:


FETCH SERIES COMMAND:
        FETCH:CE=CEK34(1)

SERIES: CE       STORED IN MEMORY AS INTERNAL SERIES NUMBER    1

****

      ...output for series #s 2-8 omitted here...

FETCH SERIES COMMAND:
        FETCH:G=GVXK34(3)


SERIES: G        STORED IN MEMORY AS INTERNAL SERIES NUMBER    9

****
```

FIGURE 2

DATA TRANSFORMATIONS

```
OPERATION PERFORMED:
T=NNP-Y

SERIES: T        STORED IN MEMORY AS INTERNAL SERIES NUMBER   10

****

OPERATION PERFORMED:
W=W1+W2

SERIES: W        STORED IN MEMORY AS INTERNAL SERIES NUMBER   11

****

OPERATION PERFORMED:
PLAG1=LAG(1,P)

SERIES: PLAG1    STORED IN MEMORY AS INTERNAL SERIES NUMBER   12

****

OPERATION PERFORMED:
KLAG1=LAG(1,K)

SERIES: KLAG1    STORED IN MEMORY AS INTERNAL SERIES NUMBER   13

****

OPERATION PERFORMED:
NPP=NNP-W2

SERIES: NPP      STORED IN MEMORY AS INTERNAL SERIES NUMBER   14

****

OPERATION PERFORMED:
NPPLAG1=LAG(1,NPP)

SERIES: NPPLAG1  STORED IN MEMORY AS INTERNAL SERIES NUMBER   15

****

OPERATION PERFORMED:
TIME=TIME(1920,1920)

SERIES: TIME     STORED IN MEMORY AS INTERNAL SERIES NUMBER   16

****

OPERATION PERFORMED:
T1931=TIME-1931

SERIES: T1931    STORED IN MEMORY AS INTERNAL SERIES NUMBER   17
```

FIGURE 3

REGRESSION EQUATIONS

```
EQUATION NUMBER:  1

SAMPLE PERIOD: 192101-194101
NUMBER OF OBSERVATIONS:  21
ORDINARY LEAST SQUARES


    DEPENDENT VARIABLE       1-CE

    C(   5-P          )=       0.25059     T=   3.56794
                       (       0.07023)

    C(  11-W          )=       0.80356     T=  20.48471
                       (       0.03923)

    C(  18-CONSTANT   )=      16.43030     T=  12.76475
                       (       1.28716)

    VARIANCE= 0.10504141E 01
    STANDARD DEVIATION=    1.02489758
    R-SQUARED=    0.9777          (ADJUSTED FOR DEGREES OF FREEDOM)
    F TEST(  2, 18)=  439.1238
    DURBIN-WATSON D STATISTIC=   1.27786


 ACTUALS   PREDICTED RESIDUALS     YEAR          RANGE     41.90  TO     71.98

    41.900    42.198    -0.298  1  1921 .+                                    .
    45.000    46.540    -1.540  2  1922 .      *  +                           .
    49.200    50.773    -1.573  3  1923 .            *  +                     .
    50.600    51.023    -0.423  4  1924 .               *+                    .
    52.600    52.484     0.116  5  1925 .                  +*                 .
    55.100    54.047     1.053  6  1926 .                     +  *            .
    56.200    54.740     1.460  7  1927 .                        +  *         .
    57.300    56.190     1.110  8  1928 .                           +  *      .
    57.800    58.269    -0.469  9  1929 .                              *+     .
    55.000    54.169     0.831 10  1930 .                           +  *      .
    50.900    50.867     0.033 11  1931 .                     +               .
    45.600    45.746    -0.146 12  1932 .         *+                          .
    46.500    46.638    -0.138 13  1933 .            +                        .
    48.700    48.923    -0.223 14  1934 .               *+                    .
    51.300    51.518    -0.218 15  1935 .                  *+                 .
    57.700    56.358     1.342 16  1936 .                           +  *      .
    58.700    59.095    -0.395 17  1937 .                              *+     .
    57.500    57.148     0.352 18  1938 .                              +      .
    61.600    60.887     0.713 19  1939 .                                 +  * .
    65.000    64.306     0.694 20  1940 .                                       + *
    69.700    71.979    -2.279 21  1941 .                                          *  +.

                                ACTUALS=*     PREDICTED=+

EQUATION SAVED AS EQ01
DEPENDENT VARIABLE: CE
```

...the graphs and related output for equations #s 2 and 3 have been deleted because of lack of space...they look essentially the same as the output for equation # 1 above...

```
EQUATION NUMBER:  2

SAMPLE PERIOD: 192101-194101
NUMBER OF OBSERVATIONS:  21
ORDINARY LEAST SQUARES

    DEPENDENT VARIABLE       6-I

    C(   5-P          )=       0.47964     T=   4.93890
                       (       0.09711)

    C(  12-PLAG1      )=       0.33304     T=   3.30205
                       (       0.10086)

    C(  13-KLAG1      )=      -0.11179     T=  -4.18279
                       (       0.02673)

    C(  18-CONSTANT   )=      10.12580     T=   1.85267
                       (       5.46550)

    VARIANCE= 0.10189667E 01
    STANDARD DEVIATION=    1.00943851
    R-SQUARED=    0.9192    (ADJUSTED FOR DEGREES OF FREEDOM)
    F TEST(  3, 17)=   76.8767
    DURBIN-WATSON D STATISTIC=   1.81021
```

```
EQUATION NUMBER:  3

SAMPLE PERIOD: 192101-194101
NUMBER OF OBSERVATIONS:  21
ORDINARY LEAST SQUARES

    DEPENDENT VARIABLE       3-W1

    C(  14-NPP        )=       0.43948     T=  13.56384
                       (       0.03240)

    C(  15-NPPLAG1    )=       0.14609     T=   3.90459
                       (       0.03742)

    C(  18-T1931      )=       0.13025     T=   4.08249
                       (       0.03190)

    C(  19-CONSTANT   )=       1.49705     T=   1.17901
                       (       1.26976)

    VARIANCE= 0.58826113E 00
    STANDARD DEVIATION=    0.76698184
    R-SQUARED=    0.9852    (ADJUSTED FOR DEGREES OF FREEDOM)
    F TEST(  3, 17)=  444.7627
    DURBIN-WATSON D STATISTIC=   1.95926
```

FIGURE 4

KLEIN MODEL I AS INITIALLY DEFINED

```
MODEL NUMBER 1

KLEIN MODEL ONE

EQUATION #   1

CE = 0.2518P+ 0.8048W+ 16.430
     (3.57)   (20.48)  (12.76)

                SEE=    1.02489758   R-BAR-SQ= 0.9777   DW=   1.278

EQUATION #   2

I = 0.4808P+ 0.3338PLAG1-0.1128KLAG1+ 10.126
    (4.94)   (3.30)       (-4.18)       (1.85)

                SEE=    1.00943851   R-BAR-SQ= 0.9192   DW=   1.810

EQUATION #   3

W1 = 0.4398WPP+ 0.1468WPPLAG1+ 0.1308T1931+ 1.497
     (13.56)    (3.90)          (4.08)       (1.18)

                SEE=    0.76698184   R-BAR-SQ= 0.9852   DW=   1.959

EQUATION #   4

Y=CE+I+G-T

EQUATION #   5

P=Y-(W1+W2)

EQUATION #   6

K=I+LAG(1,K)
```

FIGURE 5

KLEIN MODEL I AS FINALLY EDITED

```
MODEL NUMBER 1

KLEIN MODEL ONE

EQUATION #   1

CE= 0.2518(Y+T-W2)+ 0.8048(W1+W2)+ 16.430
    (3.57)   (20.48)          (12.76)

                SEE=    1.02489758   R-BAR-SQ= 0.9777   DW=   1.278

EQUATION #   2

I= 0.4808P+ 0.3338LAG(1,P)-0.1128LAG(1,K)+ 10.126
   (4.94)   (3.30)         (-4.18)         (1.85)

                SEE=    1.00943851   R-BAR-SQ= 0.9192   DW=   1.810

EQUATION #   3

W1= 0.4398(Y+T-W2)+ 0.1468(LAG(1,Y)+LAG(1,T)-LAG(1,W2))+ 0.1308T1931+ 1.497
    (13.56)         (3.90)                                (4.08)       (1.18)

                SEE=    0.76698184   R-BAR-SQ= 0.9852   DW=   1.959

EQUATION #   4

Y=CE+I+G-T

EQUATION #   5

P=Y-(W1+W2)

EQUATION #   6

K=I+LAG(1,K)
```

In order to use the final model, as shown in Figure 5, it is necessary to make assumptions about the future values of the exogenous variables; these are the variables included in the model that do not each have an equation explaining them. The assumptions are introduced by the READ ASSUMPTIONS command, which is followed by a series of commands giving the assumed values of each of the exogenous variables:

```
READ ASSUMPTIONS 1942-1946
W2,1942:9.8,10.8,11.8,12.8,13.8
G,1942:17.4,18.4,19.4,20.4,21.4
T,1942:8.2,7.9,10.8,11.9,10.3
T1931,1942:11.0,12.0,13.0,14.0,15.0
END ASSUMPTIONS
```

In order to verify that the assumptions have been entered correctly, the next command might be:

```
PRINT ASSUMPTIONS
```

However, this command is optional, for the assumptions table does not need to be printed.

Now all that is required is to tell MODLER to make the forecast:

```
FORECAST 1942-1946
```

The forecast results are printed using the PRINT command:

```
PRINT FORECAST VALUES
```

The printed assumptions and forecast values are shown in Figure 6.

FIGURE 6

ASSUMPTIONS AND FORECAST VALUES

```
                KLEIN MODEL ONE
          DEMONSTRATION OF MODLER
                ASSUMPTIONS

                1942      1943      1944      1945      1946
-------------------------------------------------------------
T              8.200     7.900    10.800    11.900    10.300
W2             9.800    10.800    11.800    12.800    13.800
T1931         11.000    12.000    13.000    14.000    15.000
G             17.400    18.400    19.400    20.400    21.400
-------------------------------------------------------------

SOLUTION INFORMATION:
     SOLUTION PERIOD:   1942 -   1946
     ALL VARIABLES TESTED FOR CONVERGENCE
     CONVERGENCE CRITERION=    0.50
     ITERATION BOUNDARY VALUES:
         MINIMUM=    2
         MAXIMUM=  150

CONVERGENCE REQUIREMENTS:
  1942:  6 ITERATIONS
  1943:  5 ITERATIONS
  1944:  7 ITERATIONS
  1945:  7 ITERATIONS
  1946:  3 ITERATIONS


                KLEIN MODEL ONE
          DEMONSTRATION OF MODLER
              FORECAST VALUES

                1942      1943      1944      1945      1946
-------------------------------------------------------------
CE            75.777    79.675    78.230    72.173    70.179
I              7.468     9.248     6.049    -0.582    -2.624
W1            55.651    58.558    57.832    51.689    47.924
Y             92.446    99.422    92.878    80.091    78.656
P             26.995    30.064    23.246    15.601    16.932
K            216.868   226.116   232.165   231.583   228.959
-------------------------------------------------------------

END OF JOB - SUMMARY OF OPERATIONS:
   59 CARDS OR COMMAND LINES READ
    3 REGRESSIONS PERFORMED
 JOB COST --     $1.66 --     1272 EXCPS --
                 755 LINES SPOOLED --    .00125 HOURS CPU TIME --
```

Klein Model I is a demonstration model only, and any forecasts made with it should not be considered as serious forecasts. However, in order to illustrate further MODLER features, it is useful to consider the effect of varying the assumptions concerning tax yields. For example, assume a tax yield of 10 percent less than in the forecast just made. To make an alternative forecast, it is only necessary to read in the changed assumptions, not those that do not change:

```
READ ASSUMPTIONS
T,1942:7.38,7.11,9.72,10.71,9.27
END ASSUMPTIONS
FORECAST 1942-1946
PRINT FORECAST VALUES
```

It is also possible to compare the two forecasts, in order to assess the effect of changing the tax yield assumptions. If, instead of the last four commands, the user issues the commands:

```
SAVE FORECAST
READ ASSUMPTIONS
T,1942:7.38,7.11,9.72,10.71,9.27
END ASSUMPTIONS
FORECAST 1942-1946
PRINT FORECAST VALUES
COMPARE FORECASTS:DIFFERENCES
```

MODLER will respond by saving the first set of forecast results, and then in response to the very last command, print out a table showing the differences between the two sets of forecast values. Instead of specifying DIFFERENCES, it is possible to specify PERCENT CHANGE or MULTIPLIERS, in order to compute respectively the percent changes in the forecasted values or the multipliers. A further interesting feature of MODLER is the ability to plot the alternative forecasted values. Following the last set of commands, if the command:

```
COMPARATIVE PLOT:Y
```

is issued, MODLER will respond with a plot against time, showing visually the effect of the assumed change in the tax yield assumptions on the values of Y. Y is only an example; any other variable that appears in the table of forecasted values may be specified instead. The final command, to end the session with MODLER, is simply the command:

```
END
```

Footnotes

[1] In addition to this description, a detailed description of MODLE is forthcoming as a paper that is to be presented at the 1981 Econom Control and Dynamics conference to be held at the Technical Univ sity of Denmark, Copenhagen, June 22-24, 1981. Copies of the pap may be obtained from the author at the address given on page 2 of t *Review and Perspective.*

[2] Lawrence R. Klein, *Economic Fluctuations in the United Stat 1921-1940,* Cowles Commission Monograph Number 11, New Yor Wiley, 1950; esp. chapter III.

[3] As explained in the appendix to Klein's monograph, the variabl used in Klein Model I are defined in a specific way, which is not nec sarily comparable to the way in which the nominally equivalent va ables are defined today in the U.S. National Income and Produ Accounts.

[4] In order to execute MODLER, it is first necessary to issue certa commands that are computer network dependent. On the Kentuc state government computing network, it is necessary to use the KE Procedure, which is invoked under TSO, by typing KEIS. The user th must designate whether he wishes to use MODLER (the batch versi of the program) or MODLERI (the interactive version). On the Ke tucky Educational Computing Network, the necessary JCL comman are:

```
//MODLER JOB 0000-00000,USERNAME
/*PASSWORD      SECRET
//PROCLIB DD DSN=UKU.@OBD01.EISPROC,DISP=SHR
//STEP1 EXEC MODLER
//EIS.SYSIN DD *
```

These JCL commands must immediately precede the first MODLE command. The MODLER termination command, END, must be f lowed by a card containing only /* in columns one and two of t card. Further details about the program may be obtained from t Manager of the Kentucky Economic Information System, at the addr given on page 2 of this issue of *Review and Perspective.*

(continued from pages 3 and 4)

The projected total impact on Kentucky Personal Income rises from $338 million in the fourth quarter of 1981 to $601 million in the third quarter of 1983, for an average quarterly impact over the entire period of $504.4. These impacts do not necessarily represent declines in various subcategories of aggregate personal income, but instead less income than would be received in the absence of the cuts. Similarly, the employment impacts do not necessarily represent a projected employment decline, but rather less employment than in the absence of the cuts. It is important to interpret correctly the impacts shown.

This analysis should be regarded as tentative, for on March 10, 1981 President Reagan announced further details concerning his economic policy proposals. Based upon this information the Office for Policy and Management is reassessing its estimates of the impact; the reassessed direct impact is very likely to exceed $400 million. Taking into account this further work by OPM, a further impact analysis will be made that also takes into account some findings by the Research Department of the Kentucky Department of Revenue. The *Council of Economic Advisors Annual Report–1981,* now in preparation, will present the findings of this further analysis.

However, the assessment presented here, although it being quickly superceded, does provide some indication of t likely impact on Kentucky of the proposed budget cuts. fact, it is possible to compute a multiplier from Table 1 th will serve as a rough rule-of-thumb guide in assessing alter tive computations of the direct impacts. As noted earlier, t average impact on Kentucky Personal Income over the peri is estimated to be $504 million. The average direct impact the Administration's proposed budget cuts is assumed to $335 million, which implies an average multiplier of 1.50. T multiplier reflects the particular direct effects estimated by t Office for Policy and Management, and will change gi another set of direct impacts, but it provides some guide, used judiciously, as to the total impact on Kentucky of ea dollar cut from the federal budget.

Footnote

[1] "Estimated Impact of Proposed 1982 Federal Budget Cuts Kentucky," Office for Policy and Management, Department of Finan Frankfort, Kentucky, February 24, 1981.

(continued from page 7)
find ways to do a more effective job of marketing in order to attract new fans, both as patrons and as legislative allies aware of the non-pari-mutuel contributions of the racing industries. In particular, some areas requiring investigation relate to non-purse determinants to attracting quality horses, such as the length of the meet, the availability of stalls, and the reality of a Kentucky circuit.

Footnotes

[1] "Racing and Economics: Part I," *The Blood-Horse*, June 28, 1980, p. 3323.

[2] Computed from data in: Killingsworth, Liddy & Co., Inc., *Taxation–A Comparative Analysis of: The Pari-Mutuel Industry–U.S. Leisure Time Corporations–U.S. Public Utilities*, Arlington, Mass. Informational pamphlets.

[3] The take-out rate for a typical North American race track is about 17 percent. In Kentucky, House Bill 478 passed March 31, 1980 and effective July 15, 1980, permits the take-out rate to increase to between 16 percent (Churchill Downs and Keeneland) and 17½ percent (Latonia and Ellis Park) on straight wagering. Where patrons are required to select two horses, the commission was increased to allow a 19 percent rate.

[4] Kentucky's pari-mutuel tax of 4.75 percent remains below that of most states, a typical tax being 6 percent. Effective pari-mutuel taxes may exceed the nominal rate depending on the distribution of the "breakage." Payoffs are rounded to the lowest dime, thus creating odd cents revenue, or breakage. In Kentucky, breakage remains with the track.

[5] John H. Cicollo, Jr., "Horse Racing," in Commission on the Review of the National Policy Toward Gambling, *Gambling in America, Appendix 1: Staff and Consultant Papers, Model Statutes, Bibliography and Correspondence*, Washington, D.C., October 1976, pp. 818-885; D. Coate and G. Ross, "The Effects of Off-Track Betting in New York City on Revenue to the City and State Governments," *National Tax Journal*, March 1974, pp. 63-69; R. Sharp and S. Simmons, "Revenue Effects of Pari-Mutuel Tax Regulation in Thoroughbred Horse Racing," *Proceedings of the Tenth Annual Conference of the Southwest Region American Institute for Decision Sciences*, Dallas, March 14-17, 1979, pp. 227-231.

[6] Pugh-Roberts Associates, Inc., *The Future of Thoroughbred Racing in the United States*, Cambridge, Mass., July 18, 1975.

[7] Ibid., p. 30.

A BRIEF SURVEY OF HORSE SALES IN LEXINGTON, KENTUCKY

by Edward Sturgeon*

Editor's Note: Ed Sturgeon gathers data on the sale of horses by the Lexington-area public auction houses annually; this article publishes these data for the first time.

From the beginning of its history, Central Kentucky has had strong ties with the horse and today is the leader in the breeding and sale of race horse stock. Prior to 1892 most horse sales were private and generally quiet transactions, although the 1874 purchase by Commodore William Vanderbilt of the trotter *Maud S* for the then–enormous price of $21,000 was highly celebrated.

In 1892, W. B. Fasig, American representative for Tattersalls Ltd. of London, England, established Tattersalls Horse Sales in Lexington. The center for the sale at auction of thoroughbreds, especially yearlings, was however Saratoga Springs, New York until the beginning of the 1940s. With the outbreak of World War II, travel and transportation restrictions were imposed which made it impossible for Kentucky breeders to transport their horses to New York for the sales. As a result, the first thoroughbred auction sale took place at Keeneland Race Course in 1943 and its initial success has continued. Two additional sale houses opened in the 1970s: Fasig-Tipton in 1970 and Kenington in 1979.[1]

Horse sale auctions are spread throughout the year. In 1980, twenty-one sales covered fifty-nine days. Thirty-five days were devoted to thoroughbred auctions, twelve were for auctions of standardbreds, and the remaining twelve days were for auctioning saddle and quarter horses. In 1980, 93 percent of the sales, representing nearly $289 million, came from the sale of thoroughbreds.

The horse industry in Lexington is a big business with substantial capital investment, high risks, and the potential for both large profits, but also losses. Sales of horses since 1975 have increased by over 330 percent and in the past year alone, the increase was nearly 45 percent. Some of this increase reflects the general inflationary trends of the past several years. For example, the Consumer Price Index for all urban consumers, has increased by 53 percent since 1975 and by 13.5 percent from 1979 to 1980. While an increase in prices paid by urban consumers bears no direct relation to horse sales, this index is used commonly as a gauge of inflation.

The following table shows the growth which has occurred in horse sales, especially in the past decade. Some of this is due to an increase in the number of horses sold but many attribute this rise to the devaluation of the dollar and to significant influx of foreign investment, as well as to inflation.

TOTAL PUBLIC AUCTION HORSE SALES LEXINGTON, KENTUCKY

Year	Sales	Year	Sales
1960	$10,434,000	1971	$ 38,506,040
1961	10,515,550	1972	59,751,090
1962	13,844,350	1973	72,161,975
1963	14,514,000	1974	65,281,940
1964	17,555,750	1975	72,428,300
1965	20,991,170	1976	94,888,657
1966	20,454,200	1977	118,281,955
1967	23,412,420	1978	165,062,335
1968	26,426,750	1979	215,351,550
1969	32,367,695	1980	312,064,125
1970	35,062,245		

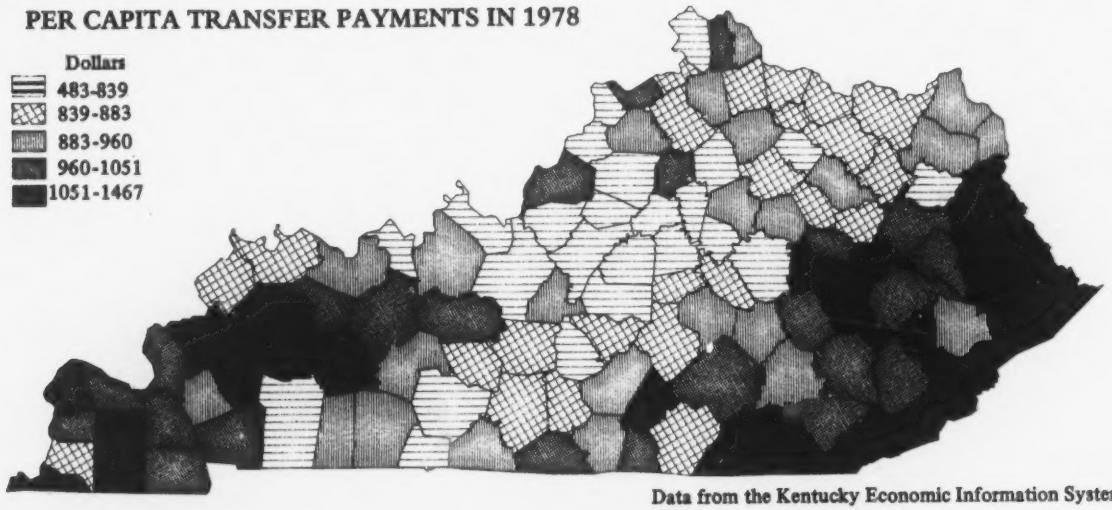
SOURCE: Data collected from the public horse auction houses by Edward Sturgeon.

Footnote

[1] For a further discussion of the local thoroughbred industry see, David Burg, "The Thoroughbred Horse Industry in the Bluegrass," *Business & Economic Review* (Bank of Lexington), November/December 1980, pp. 2 and 3.

Edward Sturgeon is Director of Research for the Lexington Chamber of Commerce.

PER CAPITA TRANSFER PAYMENTS IN 1978



Data from the Kentucky Economic Information System

Transfer payments are government and business payments to persons, generally in monetary form, for which no current services are rendered. They include social security, veterans' benefits, unemployment compensation, public assistance payments, and so forth.

The above map was produced on the ZETA plotter at the University of Kentucky Computing Center using the Kentucky Analytical Mapping System (KYAMS), which has been developed by Professor Robert G. Cromley, Department of Geography, University of Kentucky. A manual is available from the Cartographic Laboratory of the Department of Geography. Map coordinates were also supplied by the Department of Geography.

The data represented in the map are five ranges of 1978 per capita transfer payments for Kentucky counties. These data have been derived from county-level transfer payments and population data stored in the County Bank of the Kentucky Economic Information System (KEIS). As this publication goes to press, 1978 is the most recent date for which county-level transfer payments data are available.

An interface between KYAMS and the KEIS has been written by Roy Sigafus of the KCEA staff; the interface will allow KEIS users with access to the University's ZETA plotter to produce similar maps for any of the KEIS county data series, with minimal user input. Documentation of this interface is in preparation. For further information please contact Mr. Sigafus (606-258-4626).

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THE KENTUCKY COUNCIL OF ECONOMIC ADVISORS
University of Kentucky, Lexington, Kentucky 40506

June 1981
Vol. 5, No. 2

KCEA Review and Forecast

by Charles W. Hultman*

Apparent congressional support for most of the Reagan Administration's economic proposals suggests that much of the new economic program could be in effect within the next several months. Less certain is the impact of the recommended budget cuts, tax reductions and the general shift toward reduced government influence on economic activity.

The growth of the national economy during the first quarter of 1981 at an annual rate of 8.4 percent was even higher than originally expected. However, both inflation at an annual rate of 10.0 percent (as measured by the GNP implicit price deflator), and unemployment at 7.3 percent also remained relatively high.

Second quarter activity is expected to be less than that of the first three months. The Index of Leading Indicators grew by only .4 percent in April suggesting a possible slowdown in the economy. The Index had increased about 1.8 percent in March following small decreases in the preceding 3 months.

The Wharton Quarterly Model Forecast (dated April 29, 1981) suggests a real GNP growth rate of 2.71 percent in 1981 and 3.10 percent in 1982. Unemployment would rise to 7.37 percent in 1981 and fall to 7.30 percent in 1982. The percentage increase in the Consumer Price Index would decline to 10.39 in 1981 and 9.68 in 1982. Nationally the highest rates of growth are expected to occur in the personal consumption of durable goods and in gross private domestic investment.

The year 1981 started in Kentucky with one of the highest unemployment rates ever recorded for the state. Reduced activity during the second quarter reflects the slowdown at the national level and also the coal strike. It appears that the present recession, which commenced in early 1980, affected the Kentucky economy more adversely in comparison with the national economy than did the recession of 1974-75. The rapid industrialization of the Commonwealth in the decade of the 1970s has raised per capita income in the state significantly, but also has made the state increasingly subject to national economic fluctuations. In addition, both agriculture and the coal industry were in a stronger position in 1974.

The Kentucky Quarterly Econometric Model (dated May 26, 1981) projects a slow growth in real personal income–less than 1 percent–in the Commonwealth in 1981. The outlook for 1982 is more favorable with a real income growth of 4 percent. The unemployment rate will be slightly lower in 1981 and again in 1982 than in the respective preceding years.

Kentucky sectors that can expect employment difficulties in 1981 include construction and government activity. Coal mining employment is also down from 1980 because of the strike.

Expansion is expected to be greatest for the remainder of the year and into 1982 in wholesale and retail trade, and non-durable goods manufacturing.

Economic conditions are not likely to improve to any great extent in Kentucky until improvements occur at the national level. High interest rates and a reduction in federal programs assisting the states assure that economic recovery in Kentucky will be slow. Concern over inflation had led to adoption of a restrictive monetary policy by the Federal Reserve System in turn affecting the housing and automobile industry which are particularly dependent upon borrowed funds. Neither industry can be expected to experience a sharp recovery. New and imaginative mortgage financing plans may help the housing industry but it is too early to determine the general acceptability of such plans. The apparent stabilization of petroleum prices will contribute somewhat to overall price stability in the U.S. economy. More important, however, is the public's perception and anticipation of future price changes.

In general, then, economic recovery is expected to be gradual at both the national and state level. Interest rates will remain relatively high but inflationary pressures will be eased somewhat.

Charles W. Hultman is the Chairman of the KCEA and the Associate Dean for Research, College of Business and Economics, University of Kentucky.

KCEA News & Notes

The seventh annual meeting of the Kentucky Economic Association will be held on Friday, September 18, 1981, at the Executive Inn East in Louisville. A full program is being planned. Two paper sessions, two panel discussions, and the association's business meeting are all scheduled for the morning. One of the panels will consider the future of banks and savings and loan associations, especially in light of recent changes in banking regulations. Another panel is planned to consider the impact of cutbacks on higher education. Persons interested in presenting a paper should submit a detailed abstract to Professor Frank Slesnick, Program Chairman, Department of Economics, Ballarmine College, Louisville. Abstracts should be submitted by July 10, 1981. For further information call Professor Slesnick, 502-452-8244.

Dr. Paul W. McCracken, member of the Council of Economic Advisers during the Eisenhower and Nixon administrations, Chairman of the Council during President Nixon's first term, and Professor of Economics, University of Michigan, will give the luncheon address. At the afternoon's traditional forecasting session, Dr. Albert Burger, Vice-President of the St. Louis Federal Reserve Bank will discuss the outlook for the economy of the United States. Dr. Charles G. Renfro, Executive Director of the Kentucky Council of Economic Advisors, will forecast the future for the Kentucky economy.

The meeting is open to the public. Complete programs will be distributed later this summer and will include full registration information.

* * *

Dr. Charles W. Hultman, Chairman of the KCEA and a member of the Executive Board of the Eastern Economic Association, served as a session leader at the Association's annual meeting in Philadelphia, April 10, 1981. Dr. Hultman will give the keynote address, "An Economic Forecast," at the Kentucky College Placement Association's annual meeting on June 22, 1981 in Fort Mitchell, Kentucky. On June 30, 1981, he will address the 1981 Kentucky Youth Seminar on the state of the economy. This meeting will be held in Lexington and is sponsored by the University of Kentucky Cooperative Extension Service and the Kentucky Council of Cooperatives, Inc.

* * *

Dr. Charles G. Renfro, KCEA Executive Director, recently presented an invited paper, "On the Public Use of an Economic Data Base System," at the Joint Conference on Easier and More Productive Use of Computing Systems of the 3rd International Conference on Data Bases in the Humanities and Social Sciences. Dr. Renfro also chaired a panel at this meeting, which was co-sponsored by the Association for Computing Machinery's Special Interest Group on the Social and Behavioral Science of Computing (SIGSOC) and the Inter-University Consortium for Political and Social Research (ICPSR), and held at Ann Arbor, Michigan, May 20-22, 1981.

With the sponsorship of the Norwegian government, Dr. Charles G. Renfro with give an invited paper, "The Design of an Information System for State and Local Government Planning and Analysis," at the 8th European Urban Data Management Symposium, Oslo, June 2-5, 1981. Later in June he will present an invited paper on "The Design of an Econometric Modeling Language: The MODLER Software Package," at the 3rd Annual Meeting of the Society for

(continued on page 10)

KCEA Members:

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Associate Dean for Research
College of Business and Economics
University of Kentucky

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This publication is intended, primarily, to provide forecasts and current information concerning the Kentucky economy. More generally it provides a forum for the publication of short, expository articles dealing with analysis, research, or information systems, the focus of which is some aspect of the Kentucky economy.

Articles submitted for publication should be sent to the Editor at the address given above. All submissions will be reviewed independently by persons recognized as knowledgeable in the specific subject discussed. However, the ultimate responsibility for content rests with the author.

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Kentucky Econometric Model Forecast

by Charles G. Renfro and Paul A. Coomes*

This forecast for Kentucky is based upon the April 29, 1981 *Pre-Meeting Control Forecast* made by the Wharton Econometric Forecasting Associates, using the Wharton Quarterly Econometric Model of the United States (Mark 5.10). The Wharton forecast is for generally steady real growth of around 3 percent per year beginning with the first quarter of 1981 and continuing over the next eight quarters. Second quarter 1981 is forecasted to be the weakest on the horizon with real growth rising only .4 percent. This is expected because it follows a strong first quarter regarding automobile sales, and because of the effects of the coal strike. Also, high interest rates continue to restrain the housing sector. However, this national forecast is an optimistic one, based on two factors. First, the outlook for oil and food prices is very good, and should help to control inflation over the period. Secondly, personal consumption expenditures will be boosted by the tax cut expected this fall and the 11.2 percent July increase in Social Security benefits.

The implications for Kentucky of this national scenario are shown in the tables on this page and pages 4 and 5 to include a rise in non-agricultural wage and salary employment through the end of 1982. Except for the second quarter of 1981 where the impact of the coal strike on Kentucky employment and income is acute, there is a fairly strong quarter to quarter growth in the major economic variables over the forecast period. In 1981, this growth is simply making up ground lost during the 1980 downturn. However, in 1982, the state economy is expected to get back on track with strong growth in Personal Income and unemployment declining towards 100,000 persons. This forecast should be regarded as suggesting the effect on Kentucky if the April 29 Wharton national forecast were to be realized. A more detailed assessment of the economic outlook for the United States and Kentucky will be provided in the forthcoming 1981 *KCEA Annual Report*.

It is important to note that, in the forecast tables, all the figures shown for 1980 and 1981 are *forecasts*, as explained in the technical note on page 9 of the September 1980 *Review & Perspective*.

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ANNUAL SUMMARY TABLE
SELECTED ECONOMIC INDICATORS

Description	1980	1981	1982
Personal Income (Millions)	28402.5	31098.4	35244.4
% Chg.: Ky. Personal Income	8.63	9.49	13.33
Real Personal Income (Millions 1972 $)	15878.4	15946.8	16586.9
% Chg.: Ky. Real Personal Income	-1.41	0.43	4.01
Wage and Salary Disbursement	16759.8	18097.1	21237.0
Mfg. Wage & Salaries	4616.7	5202.1	6222.7
Non-Mfg. Wage & Salaries	12143.1	12895.0	15014.4
Non-Agri. Wage & Salary Employment (Thousands)	1204.3	1203.8	1260.3
% Chg.: Ky. Non-Agri. Employment	-3.33	-0.04	4.69
Manufacturing Employment	277.9	282.5	293.3
Durable Goods	154.3	154.4	159.1
Non-Durable Goods	123.6	128.1	134.2
Non-Mfg., Non-Agri. Employment	926.4	921.3	967.0
Civilian Labor Force (Thousands)	1593.0	1571.7	1616.6
Ky. Unemployment Rate (%)	8.7	7.6	6.5

QUARTERLY FORECAST TABLE
SELECTED ECONOMIC INDICATORS

Description	1981.1	1981.2	1981.3	1981.4	1982.1	1982.2	1982.3	1982.4
Personal Income (Millions)	30085.2	30129.9	31509.8	32668.8	33634.8	34562.6	35847.1	36933.3
% Chg.: Ky. Personal Income	10.89	0.60	19.62	15.54	12.36	11.50	15.71	12.68
Real Personal Income (Millions 1972 $)	15960.3	15603.3	15994.8	16228.9	16359.3	16442.7	16696.3	16849.2
% Chg.: Ky. Real Personal Income	2.88	-8.65	10.42	5.98	3.25	2.05	6.31	3.71
Wage and Salary Disbursement	17635.6	17418.0	18263.7	19071.3	20188.5	20843.1	21607.0	22309.6
Mfg. Wages & Salaries	4946.1	5154.5	5253.5	5454.2	5934.9	6167.3	6328.6	6459.8
Non-Mfg. Wages & Salaries	12689.5	12263.4	13010.2	13617.1	14253.6	14675.9	15278.3	15849.8
Non-Agri. Wage & Salary Employment (Thousands)	1201.8	1188.0	1206.2	1219.3	1235.6	1256.1	1267.7	1281.7
% Chg.: Ky. Non-Agri. Employment	4.65	-4.50	6.28	4.41	5.46	6.80	3.75	4.48
Manufacturing Employment	278.0	281.0	284.0	286.9	290.5	293.4	294.4	295.0
Durable Goods	152.5	153.6	154.8	156.7	157.9	159.3	159.6	159.7
Non-Durable Goods	125.5	127.5	129.2	130.2	132.5	134.0	134.8	135.3
Non-Mfg., Non-Agri. Employment	923.8	907.0	922.2	932.4	945.1	962.7	973.3	986.7
Civilian Labor Force	1573.3	1554.7	1572.7	1586.2	1590.7	1610.5	1624.6	1640.8
Ky. Unemployment Rate (%)	8.0	7.7	7.4	7.1	6.9	6.6	6.3	6.2

Forecast Date: May 26, 1981.

KENTUCKY QUARTERLY ECONOMETRIC MODEL

PERSONAL INCOME

DESCRIPTION	QUARTERLY 1981.1	1981.2	1981.3	1981.4	1982.1	1982.2	1982.3	1982.4	ANNUAL 1980	1981	1982
PERSONAL INCOME (MILLIONS)	30085.2	30129.9	31509.8	32668.8	33634.8	34562.6	35847.1	36933.3	28402.5	31098.4	35244.4
WAGE & SALARY DISBURSEMENTS	17635.6	17418.0	18263.7	19071.3	20188.5	20843.1	21607.0	22309.6	16759.8	18097.1	21237.0
NON-AGRI. WAGES & SALARIES	17488.6	17264.0	18113.0	18923.4	19984.3	20637.8	21403.9	22108.9	16628.9	17947.2	21033.7
MANUFACTURING	4946.1	5154.5	5253.5	5454.2	5934.9	6167.3	6328.6	6459.8	4616.7	5202.1	6222.7
DURABLE GOODS	2860.8	2911.4	2959.6	3018.2	3301.0	3387.4	3495.6	3510.5	2652.7	2937.5	3423.6
NON-DURABLE GOODS	2085.3	2243.1	2293.9	2436.0	2633.9	2779.8	2833.1	2949.3	1964.0	2264.6	2799.0
MINING	1298.3	708.6	1057.7	1307.0	1336.0	1384.7	1437.8	1502.4	1229.2	1092.9	1415.2
COAL MINING	1204.0	617.6	959.4	1197.1	1222.1	1267.5	1316.7	1376.7	1199.5	994.5	1295.8
OTHER MINING	94.3	91.0	98.2	109.9	113.9	117.1	121.1	125.7	79.7	98.4	119.5
CONTRACT CONSTRUCTION	810.8	788.7	927.1	1023.0	991.4	968.3	1091.6	1181.9	911.0	887.4	1058.3
REGULATED INDUSTRIES	1472.0	1453.2	1502.4	1546.6	1573.0	1700.9	1838.1	1937.2	1358.0	1493.5	1762.3
WHOLESALE & RETAIL TRADE	2841.3	2912.2	3013.0	3119.3	3386.5	3491.0	3605.8	3715.2	2651.2	2971.5	3549.6
SERVICES	2353.7	2443.2	2508.3	2577.9	2689.9	2796.0	2913.3	3032.7	2204.7	2470.8	2858.0
FINANCE, INS. & REAL ESTATE	676.5	689.9	719.5	733.5	763.3	780.3	815.1	828.9	629.1	704.9	796.9
GOVERNMENT	3089.9	3113.6	3131.5	3161.9	3309.3	3349.4	3373.6	3450.8	2979.1	3124.2	3370.8
CIVILIAN GOVERNMENT	2545.9	2552.6	2549.5	2574.9	2694.3	2727.4	2747.6	2818.8	2455.3	2555.7	2747.0
FEDERAL CIVILIAN	709.2	712.6	703.3	711.3	732.5	750.8	750.7	792.8	651.0	709.1	756.7
STATE & LOC. GOV'T	1836.6	1840.0	1846.2	1863.6	1961.8	1976.6	1996.8	2026.1	1804.3	1846.6	1990.3
FEDERAL MILITARY	544.0	561.0	582.0	587.0	615.0	622.0	626.0	632.0	523.8	560.5	623.8
AGRICULTURAL WAGE & SALARY	147.0	154.0	150.7	147.9	204.2	205.3	203.1	200.7	130.8	149.9	203.3
OTHER LABOR INCOME	2262.6	2247.5	2415.2	2578.2	2779.3	2921.5	3089.6	3240.5	2075.3	2375.9	3007.7
PROPRIETORS NET INCOME	2539.8	2582.5	2601.1	2647.8	2750.2	2777.3	2821.7	2879.0	2500.3	2592.8	2807.1
NON-FARM	1951.8	1985.8	2056.6	2142.2	2216.2	2272.6	2340.3	2415.4	1964.2	2034.1	2311.1
FARM	588.0	596.6	544.5	505.6	534.0	504.8	481.4	463.6	536.1	558.7	495.9
RESIDENCE ADJUSTMENT	302.5	311.8	314.4	323.2	347.3	357.4	365.5	372.3	282.5	313.0	360.6
OTHER INCOME ITEMS	8711.3	8921.6	9314.5	9487.8	9123.9	9256.2	9602.4	9806.1	7974.1	9108.8	9447.2
PROPERTY INCOME	3970.2	4075.4	4183.1	4311.3	3900.9	3985.2	4083.2	4187.2	3591.8	4135.0	4039.1
TRANSFER PAYMENTS	4741.1	4846.2	5131.4	5176.5	5223.0	5271.0	5519.2	5618.9	4382.3	4973.8	5408.0
LESS: PERSONAL CONTRIBUTIONS FOR SOCIAL INSURANCE	1366.4	1351.4	1399.2	1439.5	1554.5	1592.9	1639.1	1674.2	1189.5	1389.1	1615.2

FORECAST DATE: MAY 26,1981

KENTUCKY QUARTERLY ECONOMETRIC MODEL

EMPLOYMENT AND HOURS

DESCRIPTION	QUARTERLY 1981.1	1981.2	1981.3	1981.4	1982.1	1982.2	1982.3	1982.4	ANNUAL 1980	1981	1982
EMPLOYMENT (THOUSANDS)											
TOTAL EMPLOYMENT (RES. ADJ.)	1430.3	1417.3	1439.1	1456.7	1464.8	1487.8	1504.8	1522.8	1437.0	1435.8	1495.1
NON-AGRI. EMPLOYMENT	1340.7	1327.1	1349.4	1367.8	1372.3	1396.3	1414.4	1433.4	1349.1	1346.3	1404.1
WAGE & SALARY EMPLOYMENT	1201.8	1188.0	1206.2	1219.3	1235.6	1256.1	1267.7	1281.7	1204.3	1203.8	1260.3
MANUFACTURING	278.0	281.0	284.0	286.9	290.5	293.4	294.4	295.0	277.9	282.5	293.3
DURABLE GOODS	152.5	153.6	154.8	156.7	157.9	159.3	159.6	159.7	154.3	154.4	159.1
NON-DURABLE GOODS	125.5	127.5	129.2	130.2	132.5	134.0	134.8	135.3	123.6	128.1	134.2
MINING	53.8	37.2	50.5	54.5	55.7	56.8	58.0	59.9	53.7	49.0	57.6
COAL MINING	48.0	30.8	43.7	47.5	48.7	49.7	50.8	52.5	48.6	42.5	50.4
OTHER	5.7	6.4	6.8	6.9	7.0	7.1	7.2	7.4	5.1	6.5	7.2
CONTRACT CONSTRUCTION	54.3	55.2	56.4	57.4	61.6	64.2	64.9	66.0	59.3	55.8	64.2
REGULATED INDUSTRIES	69.6	69.5	69.2	69.3	65.0	75.2	81.6	86.7	67.4	69.4	77.1
WHOLESALE & RETAIL TRADE	259.8	261.7	264.9	268.7	272.8	276.5	279.7	282.6	259.1	263.8	277.9
SERVICES	212.1	211.5	211.7	214.0	214.0	214.1	214.3	215.1	210.6	212.3	214.4
FINANCE, INSURANCE & REAL ESTATE	48.0	48.5	48.9	49.9	50.4	51.1	51.5	52.2	48.3	48.8	51.3
GOVERNMENT	226.3	223.5	220.5	218.6	225.7	224.7	223.5	224.1	228.1	222.2	224.5
FEDERAL	40.5	40.0	39.0	38.0	38.2	38.5	38.0	38.6	39.0	39.4	38.3
STATE & LOCAL	185.8	183.5	181.5	180.6	187.5	186.2	185.5	185.5	189.1	182.8	186.2
EDUCATION	108.8	107.3	106.1	106.0	113.6	113.1	113.1	113.9	110.1	107.0	113.4
OTHER	77.0	76.2	75.4	74.6	73.9	73.1	72.4	71.6	79.0	75.8	72.7
ALL OTHER NON-AG EMPL	139.0	139.1	143.1	148.5	136.7	140.2	146.7	151.8	144.8	142.4	143.8
AGRICULTURAL	72.5	73.2	72.8	71.9	75.5	74.5	73.4	72.4	70.9	72.6	73.9
HIRED WORKERS	21.4	21.8	21.2	20.3	24.4	24.0	23.3	22.7	20.3	21.2	23.6
FAMILY & OTHER UNPAID	51.1	51.3	51.5	51.6	51.0	50.5	50.1	49.7	50.7	51.4	50.3
HOURS & MANHOURS											
AVERAGE WEEKLY HOURS											
DURABLE MANUFACTURING	40.0	40.5	39.8	39.4	40.0	41.0	41.1	40.4	39.3	40.0	40.6
NON-DURABLE MANUFACTURING	40.0	40.0	40.0	40.0	40.2	40.6	39.7	39.8	40.1	40.0	40.1
MANHOURS											
TOTAL MANUFACTURING	5782.6	5885.7	5895.5	5921.6	6058.6	6226.4	6190.3	6153.3	5734.4	5871.3	6157.2
DURABLE GOODS	3172.9	3234.4	3207.4	3213.8	3287.9	3396.6	3408.5	3353.0	3158.3	3207.1	3361.5
NON-DURABLE GOODS	2609.7	2651.3	2688.1	2707.8	2770.7	2829.7	2781.8	2800.3	2576.1	2664.2	2795.6
DAYS & MAN-DAYS											
COAL MINING DAYS WORKED	51.2	40.3	43.4	48.9	48.0	47.9	47.9	47.7	52.6	46.0	47.9
COAL MINING MAN DAYS	9838.0	4963.5	7582.8	9304.9	9342.4	9529.4	9735.6	10010.9	10219.5	7922.3	9654.6
LABOR FORCE											
RESIDENT ADJUSTED LABOR FORCE	1573.3	1554.7	1572.7	1586.2	1590.7	1610.5	1624.6	1640.8	1593.0	1571.7	1616.6
LABOR FORCE (NOT RES. ADJ.)	1556.3	1537.7	1555.7	1569.2	1573.7	1593.5	1607.6	1623.8	1576.0	1554.7	1599.6
UNEMPLOYMENT	126.0	120.4	116.5	112.5	109.0	105.6	102.8	100.9	139.0	118.9	104.6
UNEMPLOYMENT RATE (%)	8.0	7.7	7.4	7.1	6.9	6.6	6.3	6.2	8.7	7.6	6.5

FORECAST DATE: MAY 26, 1981

selected indicators OF ECONOMIC ACTIVITY

These tables of selected indicators of economic activity were prepared by a special-purpose program of the Kentucky Economic Information System. The data in the tables are reported figures which were obtained from a variety of state and federal agencies, as well as from private firms.

UNITED STATES DATA

	Jan. 1981	Feb. 1981	Mar. 1981	Qtr. I 1981	% Chg. 80-IV 81-I	% Chg. 80-I 81-I
CONSUMER PRICE INDEXES (1967=100, NOT SEASONALLY ADJUSTED)						
CONSUMER PRICE INDEX, ALL URBAN CONSUMERS (CPI-U), ALL ITEMS	260.50	263.20	265.10	262.93	2.64	11.19
CONSUMER PRICE INDEX, ALL URBAN CONSUMERS (CPI-U), FOOD AND BEVER	261.40	263.70	265.00	263.37	2.32	10.18
CONSUMER PRICE INDEX, ALL URBAN CONSUMERS (CPI-U), HOUSING	279.10	280.90	282.60	280.87	2.53	12.00
CONSUMER PRICE INDEX, ALL URBAN CONSUMERS (CPI-U), APPAR & UPKEEP	181.10	182.00	185.10	182.73	-0.80	5.65
CONSUMER PRICE INDEX, ALL URBAN CONSUMERS (CPI-U), TRANSPORTATION	264.70	270.90	273.50	269.70	4.24	12.88
CONSUMER PRICE INDEX, ALL URBAN CONSUMERS (CPI-U), MEDICAL	279.50	282.60	284.70	282.27	2.88	9.69
CONSUMER PRICE INDEX, ALL URBAN CONSUMERS (CPI-U), ENTERTAINMENT	214.40	216.70	218.20	216.43	2.40	9.37
CONSUMER PRICE INDEX, ALL URBAN CONSUMERS (CPI-U), OTHER	226.20	227.40	228.70	227.43	2.00	9.47
CONSUMER PRICE INDEX (CPI-U), SPECIAL INDEX: ENERGY	381.70	401.10	409.30	397.37	7.93	16.02
PRODUCER PRICE INDEXES (1967=100, NOT SEASONALLY ADJUSTED)						
PRODUCER PRICE INDEX, ALL FINISHED GOODS	259.80	262.40	265.30	262.50	2.43	10.59
PRODUCER PRICE INDEX, FINISHED CONSUMER GOODS	261.40	264.00	267.30	264.23	2.44	10.45
PRODUCER PRICE INDEX, INTERMEDIATE MATERIALS	295.50	297.80	301.40	298.23	2.99	10.13
PRODUCER PRICE INDEX, INTERMEDIATE MATERIALS FOR MANUFACTURING	278.70	279.70	281.00	279.80	2.01	8.38
PRODUCER PRICE INDEX, CRUDE MATERIALS	321.30	335.50	333.00	329.93	1.95	12.49
PRODUCER PRICE INDEX, CRUDE FOODSTUFFS AND FEEDSTUFFS	270.60	267.10	262.00	266.57	-3.42	7.60
PRODUCER PRICE INDEX, BITUM. COAL, INDUSTRIAL,SPOT(1967=100)	397.00	400.40	400.80	399.40	0.52	2.06
PRODUCER PRICE INDEX, BITUM. COAL, INDUSTRIAL,CONTRACT(JUNE76=100)	135.70	136.30	136.50	136.17	1.19	4.29
CONSUMER PRICES: ENERGY (U.S. CITY AVERAGE)						
AVG PRICE FOR UTILITY (PIPED) GAS, PER 40 THERMS	17.93	18.02	18.32	18.09	2.94	12.96
AVG PRICE FOR UTILITY (PIPED) GAS, PER 100 THERMS	40.05	40.29	41.08	40.47	1.11	14.12
AVG PRICE FOR ELECTRICITY, PER 500 KWH	31.55	32.10	32.47	32.04	4.21	16.44
AVG PRICE FOR FUEL OIL #2 (HOME HEATING OIL), PER GALLON	1.15	1.26	1.29	1.23	19.20	27.06
AVG PRICE, GASOLINE, ALL TYPES, PER GALLON	1.27	1.35	1.39	1.34	9.09	13.73
AVG PRICE, GASOLINE, LEADED REGULAR, PER GALLON	1.24	1.32	1.35	1.30	9.46	13.46
AVG PRICE, GASOLINE, UNLEADED REGULAR, PER GALLON	1.30	1.38	1.42	1.37	9.02	14.12
AVG PRICE, GASOLINE, LEADED PREMIUM, PER GALLON	1.34	1.41	1.45	1.40	7.34	14.70
LABOR FORCE (SEASONALLY ADJUSTED)						
LABOR FORCE, CIVILIAN (MILLIONS)	105.54	105.68	106.18	105.80	0.60	1.52
EMPLOYMENT, TOTAL (MILLIONS)	97.70	97.93	98.41	98.01	0.76	0.30
EMPLOYMENT, AGRICULTURE	3.40	3.28	3.28	3.32	-0.93	0.07
EMPLOYMENT, NONAGRICULTURAL INDUSTRIES	94.29	94.65	95.14	94.69	0.82	0.31
UNEMPLOYMENT RATE, TOTAL	7.40	7.30	7.30	7.33	-2.22	17.65
UNEMPLOYMENT RATE, BLACKS & OTHER RACIAL MINORITIES	12.90	13.10	13.70	13.23	-5.92	11.83
OTHER SELECTED NATIONAL INDICATORS:						
U.S. GROSS NATIONAL PRODUCT (B $) (% CHG AT ANNUAL RATE)	NA	NA	NA	2853.80	19.31	10.97
U.S. REAL GROSS NATIONAL PRODUCT (B 72$) (% CHG AT ANNUAL RATE)	NA	NA	NA	1516.00	8.44	0.94
PERSONAL INCOME, TOTAL, SEASONALLY ADJUSTED (B $)	2300.70	2317.70	2337.90	2318.70	11.55	11.04
COMPOSITE INDEX OF 12 LEADING INDICATORS (1967=100)	135.90	135.20	137.10	136.07	-0.78	1.97
INDEX OF INDUSTRIAL PRODUCTION, SEASONALLY ADJUSTED (1967=100)	151.70	151.10	151.70	151.50	1.61	-0.55
INTEREST RATE, YIELD ON 3-MONTH TREASURY BILLS	14.72	14.90	13.48	14.37	4.81	6.77
PRIVATE HOUSING UNITS AUTH. 16000 PERMIT-ISSUING PLACES (SADJ THOU)	1228.00	1165.00	1137.00	3530.00	-34.44	3.61
TOTAL INSTALLMENT CREDIT OUTSTANDING AT END OF MONTH (B $)	310.55	309.19	310.77	310.17	0.19	0.02

KENTUCKY DATA

	Jan. 1981	Feb. 1981	Mar. 1981	Qtr. I 1981	% Chg. 80-IV 81-I	% Chg. 80-I 81-I
LABOR FORCE (NOT SEASONALLY ADJUSTED, THOUSANDS)						
LABOR FORCE, TOTAL CIVILIAN	1635.70	1626.80	1625.40	1629.30	0.12	3.96
EMPLOYMENT, TOTAL, BY PLACE OF RESIDENCE	1465.50	1461.30	1476.70	1467.83	-2.45	1.93
EMPLOYMENT, AGRICULTURAL	46.40	49.20	54.10	49.90	-31.46	-2.67
EMPLOYMENT, TOTAL NON-AGRICULTURAL	1419.10	1412.10	1422.60	1417.93	-0.97	2.10
UNEMPLOYMENT RATE	10.40	10.20	9.10	9.91	31.37	22.18
EMPLOYMENT, TOTAL NON-AGRICULTURAL WAGE AND SALARY	1206.50	1194.00	1198.00	1199.50	-1.69	0.17
EMPLOYMENT, BITUMINOUS COAL & LIGNITE MINING (SIC 12)	51.30	51.30	51.50	51.37	8.60	8.75
EMPLOYMENT, CONTRACT CONSTRUCTION	49.70	48.00	50.40	49.37	-18.36	-0.34
EMPLOYMENT, TOTAL MANUFACTURING	274.60	274.00	274.10	274.23	0.77	-4.19
EMPLOYMENT, MANUFACTURING, DURABLE	153.80	154.60	155.20	154.53	1.96	-4.84
EMPLOYMENT, MANUFACTURING, NON-DURABLE	120.80	119.40	118.90	119.70	-0.72	-3.34
EMPLOYMENT, TRANSPORTATION, COMMUNICATIONS & PUBLIC UTILITIES	67.60	67.40	67.40	67.47	-1.84	-1.12
EMPLOYMENT, WHOLESALE & RETAIL TRADE	267.70	254.20	253.40	258.43	-2.71	1.10
EMPLOYMENT, FINANCE, INSURANCE & REAL ESTATE (SIC 60-67)	52.00	52.10	52.00	52.03	0.06	1.76
EMPLOYMENT, SERVICES (SIC 70-80)	205.40	206.20	208.90	206.83	-2.24	1.70
EMPLOYMENT, CIVILIAN GOVERNMENT	234.10	236.60	235.80	235.50	-0.80	1.90
EMPLOYMENT, STATE & LOCAL GOVERNMENT	189.80	192.50	191.60	191.30	-0.98	-0.80
HOURS AND EARNINGS OF PRODUCTION WORKERS IN MANUFACTURING						
AVG WEEKLY HOURS, PROD WORKERS, TOTAL MANUFACTURING	40.00	39.20	40.00	39.73	-1.57	2.14
AVG WEEKLY HOURS, PROD WORKERS, MANUFACTURING DURABLES	40.50	39.70	40.50	40.23	-1.23	1.86
AVG WEEKLY HOURS, PROD WORKERS, NON-DURABLE MANUFACTURING	39.30	38.70	39.30	39.10	-2.09	2.53
AVG HOURLY EARN, PROD WORKERS, TOTAL MANUFACTURING	7.58	7.70	7.70	7.66	0.00	9.12
AVG HOURLY EARN, PROD WORKERS, MANUFACTURING DURABLES	8.17	8.33	8.33	8.28	0.77	10.45
AVG HOURLY EARN, PROD WORKERS, NON-DURABLE MANUFACTURING	6.80	6.86	6.85	6.84	-1.72	7.27
AVG WEEKLY EARN, PROD WORKERS, TOTAL MANUFACTURING	303.20	301.84	308.00	304.35	-1.57	11.45
AVG WEEKLY EARN, PROD WORKERS, MANUFACTURING DURABLES	330.89	330.70	337.37	332.99	-0.47	12.51
AVG WEEKLY EARN, PROD WORKERS, NON-DURABLE MANUFACTURING	267.24	265.48	269.21	267.31	-3.77	9.99
INDEX OF PRICES RECEIVED BY KY FARMERS (1972=100)						
INDEX OF PRICES REC'D BY KY FARMERS, CROP AND LIVESTOCK PRODUCTS	179.57	178.56	182.39	180.17	0.11	4.78
INDEX OF PRICES REC'D BY KY FARMERS, LIVESTOCK PRODUCTS	153.15	150.74	160.61	154.83	-7.10	-12.26
INDEX OF PRICES REC'D BY KY FARMERS, CROPS	196.15	196.03	196.04	196.07	4.11	15.96
MINING (MILLIONS OF TONS, MILLIONS OF TAX DOLLARS)						
BITUMINOUS COAL & LIGNITE, PHYSICAL OUTPUT, EASTERN KY, TOTAL	9.00	9.50	10.66	29.16	10.11	14.24
BITUMINOUS COAL & LIGNITE, PHYSICAL OUTPUT, WESTERN KY, TOTAL	3.97	3.56	4.26	11.80	24.17	9.79
AVG HOURLY EARN, PROD WORKERS, BITUMINOUS COAL & LIGNITE MINING	11.90	11.95	16.11	13.32	17.70	20.36
AVG WEEKLY EARN, PROD WORKERS, BITUMINOUS COAL & LIGNITE MINING	478.39	506.68	423.69	469.58	0.77	3.51
AVG WEEKLY HOURS, PROD WORKERS, BITUMINOUS COAL & LIGNITE MINING	40.20	42.40	26.30	36.30	-11.82	-11.39
TAX RECEIPTS, COAL SEVERANCE, CONSOLIDATED, TOTAL	18.03	4.26	28.00	50.29	*	5.59
CONSTRUCTION (MILLIONS OF $, NO. OF PRIVATE RESID. UNITS--NOT SEAS ADJ)						
VALUE OF CONSTRUCTION CONTRACTS, RESIDENTIAL & NON-RES	100.10	154.70	156.20	411.00	-16.50	44.72
PERMIT AUTHORIZED CONSTRUCTION, NO. OF 1-FAMILY RESID. UNITS	212.00	251.00	599.00	1062.00	-21.57	6.09
VALUE OF PERMIT AUTHORIZED CONSTRUCTION, 1-FAMILY RESID. UNITS	10.04	11.21	25.74	46.99	-23.59	16.38
PERMIT AUTHORIZED CONSTRUCTION, NO. OF RESID. UNITS, TOTAL	526.00	442.00	816.00	1784.00	-18.01	6.70
VALUE OF PERMIT AUTHORIZED CONSTRUCTION, ALL RESID. UNITS, TOTAL	17.91	14.09	30.39	62.39	-26.92	9.32
RETAIL SALES (000$, 000 CARS)						
TAX RECEIPTS, GENERAL FUND, SALES AND GROSS RECEIPTS	69084.88	48691.71	62117.10	179893.63	*	-1.89
NEW PASSENGER CAR REGISTRATIONS, TOTAL, NOT SEAS. ADJ.	5.43	7.00	6.98	19.42	*	44.00
FINANCE AND INSURANCE (MILLIONS OF DOLLARS)						
NET LOANS MADE & ACQUIRED BY KY. SAVINGS & LOAN ASSOCIATIONS	25.92	23.43	34.33	83.68	-54.56	23.42
SALES OF ORDINARY LIFE INSURANCE	349.18	397.66	479.94	1226.77	5.08	16.40
SELECTED STATE GOVERNMENT RECEIPTS						
TAX AND NONTAX RECEIPTS, GENERAL FUND, TOTAL (MIL $)	193.95	157.74	155.06	506.75	*	2.35
TAX RECEIPTS, GENERAL FUND, SALES & USE TAXES, TOTAL (THOU $)	65589.69	45860.88	44954.80	156405.31	*	-2.63
TAX RECEIPTS, GENERAL FUND, INCOME TAX, INDIVIDUAL (THOU $)	42467.79	77298.31	15020.51	134786.56	*	5.25
TAX RECEIPTS, GENERAL FUND, INCOME TAX, CORPORATION (THOU $)	7720.54	3938.53	7409.74	19068.80	*	-17.30
TAX RECEIPTS, STATE ROAD FUND, STATE SHARE (THOU $)	22591.27	19622.09	40889.22	83102.56	*	-13.24
TAX RECEIPTS, STATE ROAD FUND, MOTOR FUELS NORMAL, TOTAL (THOU $)	14015.17	7763.23	21099.62	42878.01	*	-18.30
TAX RECEIPTS, STATE ROAD FUND, MOTOR VEHICLE USAGE TAX (THOU $)	6105.86	7099.03	8688.57	21893.46	*	-3.18

PRIVATE SOURCES FOR THE ABOVE DATA INCLUDE:
F. W. DODGE DIVISION (MCGRAW-HILL INFORMATION SYSTEMS COMPANY), VALUE OF CONSTRUCTION CONTRACTS;
LIFE INSURANCE MARKETING & RESEARCH ASSOCIATION, SALES OF ORDINARY LIFE INSURANCE;
R. L. POLK & COMPANY, NEW CAR REGISTRATIONS

* = QUARTER TO QUARTER COMPARISONS NOT MEANINGFUL DUE TO SEASONAL VARIATION

The Effect of Tax Revision on Revenue Adequacy in Kentucky

by Stephen E. Lile*

Slower than expected growth in state government revenues has led to sharp reductions in budgeted expenditures in Kentucky in recent months. The two reasons most frequently given to account for this revenue shortfall are the recession and the tax cuts enacted in 1979 by a special session of the Kentucky General Assembly. Both explanations are in part correct but they fail to account for the unusually large decrease in General Fund revenue growth that has accompanied the latest recessionary period. A careful look at the alterations made to Kentucky tax laws and rates during the decade of the 1970s reveals that there is now more reliance for revenue on those taxes that are most sensitive to changes in the incomes of individual and corporate taxpayers.

This article reviews the major tax revisions of the past ten years and shows that Kentucky's tax structure has changed from an emphasis on sales and property taxes to a greater relative emphasis on severance and income-based taxes. These changes, while furthering the goal of tax equity, are shown to have contributed to the current revenue shortfall by making the Kentucky tax system more sensitive to economic fluctuations.

Tax equity has no precise meaning but to many people equity requires a proportional or perhaps even a progressive distribution of the tax burden among income groups.[1] The federal individual income tax and the state sales tax are often given as examples of progressive and regressive taxes, respectively. The degree of "gressivity" can be measured by relating dollars of tax paid to income level. In general, this percentage rises for income-based taxes but declines somewhat for consumption-based taxes such as the typical sales tax.

Tax elasticity is the term used to measure the sensitivity of tax revenues to changes in Personal Income. It is conventionally computed by dividing the percentage change in tax revenue between two points in time by the corresponding percentage change in Personal Income. A tax is classified as elastic if this ratio of change is greater than 1.0 and inelastic if it is less than 1.0. For example, hypothetical tax A would be elastic if the revenue yield increased by 50 percent during a period when Personal Income grew by 40 percent. The principal determinant of elasticity is the relationship between tax base and Personal Income. The best example of an inelastic tax is a lump-sum or head tax, in which case tax owed remains constant regardless of income level and the elasticity coefficient is 0. In contrast, a progressive income tax is a good example of an elastic tax and the elasticity coefficient might be 1.5, 2.0 or even higher.

Tax revisions since 1970 have affected both equity and the relative importance of elastic and inelastic taxes in the Kentucky tax system. Exhibit 1 lists the ten most important tax changes in terms of their effect on state General Fund revenues. These are briefly summarized below.

EXHIBIT 1

MAJOR TAX LEGISLATION IN KENTUCKY, 1970-79

Year	Legislation	Description
1970	H.B. 442	Implemented farmland preferential assessment program
1972	H.B. 162	Implemented the property tax homestead exemption
	H.B. 337	Exempted "grocery store" food and prescription drugs from sales taxation
	H.B. 337	Increased the *effective* rate of the corporate income tax
	H.B. 337	Enacted the coal severance tax
1974	S.B. 179	Exempted pollution control facilities from most state and local taxes
1976	H.B. 4	Transferred 30 cents of the local property tax rate to the state rate
	H.B. 172	Exempted repair and replacement parts on farm machinery from the sales tax
	H.B. 677	Increased the coal severance tax
1978	H.B. 12	Exempted certain purchases by farmers from the sales tax
1979	H.B. 43	Exempted residential utility bills from the sales tax
	H.B. 44	Limited state property tax revenue growth from real property to an annual rate of 4 percent, unless approved by the voters

SOURCE: Kentucky Department of Revenue, *Annual Report*, 1970-1979.

Property tax revisions. The most important property tax revisions were implementation of the farmland preferential assessment program in 1970, the homestead exemption in 1972, and enactment in 1979 of legislation limiting the annual growth rate in state property tax revenue on real property to four percent, unless approved by the voters.

Sales tax revisions. Sales tax revision in Kentucky has been a one-way street in that all alterations have narrowed, rather than broadened, the list of taxable items. The most important change occurred in 1972 when grocery store food and prescription drugs were eliminated from taxation. Less important exemptions were introduced in 1974, 1976, and 1978 and these involved pollution control facilities, repair and replacement parts for farm machinery, and gasoline, fuel, and a variety of items purchased in connection with farming. The most recent change took place in 1979 with removal of residential utility bills from the sales tax base.

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Corporate income tax revisions. The yield from this tax was increased in 1972 in an effort to recoup part of the revenue loss resulting from the exemption of food from sales taxation. Specifically, the five percent rate levied against the first $25,000 of taxable corporate income was reduced to four percent and the seven percent rate applied to corporate income in excess of $25,000 was reduced to 5.8 percent. Coupled with this reduction in rates, the General Assembly removed the deduction for the federal corporate income tax from the computation of state corporate taxable income. These changes became effective January 1, 1972. The net effect was to increase the effective state tax rate for most corporations.

Coal severance tax. This tax was also enacted in 1972 in an effort to compensate for removal of food from sales taxation. Originally, the rate was the greater of four percent of the gross value of coal or thirty cents per ton. The 1976 General Assembly increased the tax, effective July 1, 1976, to 4.5 percent of the gross value of coal mined in Kentucky or 50 cents per ton, whichever is greater.

EXHIBIT 2

ESTIMATES OF REVENUE EFFECTS FOR FISCAL YEAR 1980 FROM MAJOR TAX REVISIONS ENACTED DURING THE 1970s (Millions of Dollars)

	Revenue Loss	Revenue Gain
Sales Tax Exemptions		
Food	$125.0	
Fuel and Utilities[1]	75.0	
Medicine	10.0	
Farm Machinery	10.0	
Miscellaneous	20.0	
Severance Tax[2]		$176.4
Corporate Income Tax		N.A.
Property Tax		
Deferred Agricultural Assessments	17.0	
Homestead Exemption	5.0	
	$262.0	$176.4[3]

[1] The author estimates, from the vantage point of 1981, that the revenue loss due to this exemption was probably substantially lower than the $75 million shown above.
[2] Severance tax shown is the actual revenue for FY 1980.
[3] Plus corporate income tax gains.

SOURCE: Unpublished estimates prepared by the Research Division, Kentucky Department of Revenue, January 8, 1980.

Exhibit 2 shows the effect on state revenues of the major Kentucky tax revisions of the past decade. Unfortunately, there are no estimates available for the revenue gains which have resulted from the changes in the laws relative to the corporate income tax. There is reason to believe, however, that the net effect of these changes has been increased revenues. Nonetheless, corporate income tax revenues are clearly tied to corporate profits, rising only when profits rise. The corporate income taxes paid in fiscal year (FY) 1980 were 2.8 percent below those paid in FY 1979, reflecting the general downturn in the economy in FY 1980. While revenues from corporate income taxes are undoubtedly greater than they would have been without the 1972 corporate income tax changes, they still fell off in FY 1980.

EXHIBIT 3

INCOME ELASTICITY ESTIMATES OF MAJOR KENTUCKY TAXES

	Estimate A[1]	Estimate B[2]	Author's Average Estimate
Individual Income	1.56	1.94	1.26
Corporate Income	1.36	1.19	1.23
Sales and Use	.91	.92	.90
Property			
Jefferson County	–	.50	–
State[3]	–	–	.85
Coal Severance	1.14	–	–

[1] Estimate A is from Lawrence K. Lynch, "Outlook for Kentucky Tax Revenues," *Kentucky Economy: Review & Perspective*, Vol. 4, No. 2, June 1980, p. 11.
[2] Estimate B is from Advisory Commission on Intergovernment Relations, *State-Local Finances: Significant Features and Suggested Legislation* (Washington, D.C.: Government Printing Office, 1972), p. 301.
[3] Excluding 1977-78, when 30 cents of local tax was transferred to the state.

Overall, the tax revisions made during the seventies generally represented deemphasis of sales and property tax coupled with greater use of coal severance and corporate income tax. An idea of the effect that these changes had can be obtained from estimates of income elasticity, shown in Exhibit 3. The elasticity estimates in columns A and B both indicate differences among tax types in their degree of sensitivity to income changes. The author also calculated elasticity estimates for each of the fiscal years, 1973-80, using the formula $(T_2\text{-}T_1/T_1)/(Y_2\text{-}Y_1/Y_1)$, where T = tax revenue and Y = Personal Income. The averages of these elasticities are shown in Exhibit 3 and are generally similar to estimates A or B. Year to year, however, there was wide variance in the elasticity estimates for some tax types, especially the corporate income tax. This variance is partly explained by the fact that processing of tax receipts is not uniform, year to year. Further, the corporate income tax is heavily dependent on the coal industry, which has had considerable fluctuation in taxable income. Any of the sets of elasticities lead one to predict greater revenue fluctuations following the types of tax revisions reviewed above.

The majority of the tax revisions enacted during the seventies were supported on tax equity grounds. Proposals to eliminate the sales tax or to narrow its base and reduce property taxes are generally endorsed as a means of lightening the tax burden on low income persons, thereby reducing regressivity.[2] Tax equity is also the primary argument for increases in either the individual or corporate income tax. It is clear that the tax revisions made during the seventies furthered the goal of equity as perceived by most people. But the elasticity estimates cited above suggest that these tax revisions also had the additional effect of making the Kentucky tax system more sensitive to economic fluctuations.

Taxes of relatively high income elasticity further the objective of revenue adequacy during a period of expanding economic activity. Indeed, their use may lead to Proposition

13-type demands for limits on government taxing and spending.[3] They are likely to contribute, however, to inadequate revenue growth during a period like the present which is characterized by a combination of high unemployment and high inflation as revenue growth lags behind the increased cost of providing government services. This is essentially the situation that Kentucky finds itself in in 1981.[4]

Tax revisions enacted over the past decade in Kentucky have reduced revenues below the level that would otherwise have occurred and have made the tax system more sensitive to the business cycle by reducing the relative importance of sales and property taxes. These changes have therefore contributed to the revenue shortfall of 1980-81. If the coal strike and general sluggishness of the economy continue into the Fall, there will likely be more support for some type of tax increase. In this event, the 1982 General Assembly may have to reconsider the often conflicting goals of tax equity and revenue adequacy as they relate to Kentucky tax policy.

Notes

[1]Unfortunately, discussions of equity frequently omit from consideration the distribution of government expenditure benefits among income classes. In addition, many types of in-kind income received by families of low money income are excluded from income when tax paid is computed as a percentage of income.

[2]It is interesting to note that property tax policy in Kentucky and many other states continues to be based on the traditional incidence assumption that the tax levied on rental and business property in general is shifted to tenants and consumers and is, therefore, distributed regressively by income group. A new view, however, holds that the property tax is largely borne by owners of capital and is distributed progressively. For a comparison of these incidence views see Henry J. Aaron, *Who Pays the Property Tax: A New View* (Washington, D.C.: Brookings, 1975), Ch. 3. This new view, if accepted by policymakers, may yet seem largely irrelevant in the case of low income homeowners, such as retired persons, for whom the property tax on housing represents a substantial fraction of income.

[3]For a discussion of limits see Stephen E. Lile, Don M. Soule and James Wead, *Limiting State Taxes and Expenditures* (Lexington, Ky.: Council of State Governments), November 1978.

[4]The recent contraction in the Kentucky economy is shown by data recently released by the Bureau of Economic Analysis, U.S. Department of Commerce, indicating a decrease in the relative level of Kentucky's per capita Personal Income when compared to the per capita Personal Income for the U.S. as a whole. In 1979, Kentucky's per capita Personal Income was 84.3 percent of the national average; in 1980 its relative position had dropped to 81.6 percent. U.S. Department of Commerce, *News* (BEA 81-25), May 3, 1981.

KCEA News & Notes

(continued from page 2)

Economic Dynamics and Control which will be held in Copenhagen, Denmark, June 22-24, 1981.

Copies of all of these papers will be available from the KCEA office.

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Disaggregated county-level Personal Income data for 1979, and revisions of these data for 1977-78, have recently been released by the Bureau of Economic Analysis (BEA), U.S. Department of Commerce, and have been added to the County Bank of the Kentucky Economic Information System (KEIS). BEA has also recently released quarterly disaggregated state-level Personal Income data through the 4th quarter, 1980, including revisions in these series beginning with the 1st quarter, 1977. These quarterly data, along with annual state-level Personal Income, real Personal Income, per capita Personal Income, and real per capita Personal Income for 1980, have also been added to the database of the KEIS, in the quarterly and annual banks, respectively. The table of percentage changes in county-level Personal Income, 1975-79, found on the following page, and the map on page 12 which gives a more visual look at this same information, has been produced using these newly released data.

Another set of data recently added to the KEIS database are county-level annual series related to coal production, 1970-78. Data are on total production, production from underground mines, production from surface mines, average value per ton, and total value of production.

Persons who are unfamiliar with the KEIS but who wish to access any of these data directly are encouraged to call the Manager of the KEIS, Margaret O. Adams (606-258-4626), for further information.

Users of the KEIS on the Kentucky Educational Computing Network (KECNET) can now produce standard indexes to the KEIS databanks for less than half the cost of producing them with the KEIS program, INDEX. The new program is called CINDEX, and it is prepared in the same manner as INDEX (p. 3.2.1 in the *KEIS User Manual*), except for the EXEC card, which looks like:

```
//STEP1 EXEC CINDEX,BANK=bank initial
```

Users should note that preparation of the ABANK (annual bank) or CBANK (county bank) index takes more than the default time of 10 seconds, so the time parameters on the JOB card should be included for these indexes. For example:

```
//jobname JOB 0000-00000,'your name',TIME=(0,20)
```

For further information about this or any of the other KEIS programs, please call Roy Sigafus, KCEA Senior Systems Analyst/Programmer (606-258-2646).

* * *

The April 1981 issue of *Growth and Change: A Journal of Regional Development* contains several articles of potential interest to our readers. Among these are articles on predicting the economic effects of state policy initiatives, and on simulating the impact of an irrigation project on a small regional economy. The July issue will contain reviews of several books which may be of interest. Among these are: *The U.S. Multiregional Input-Output Accounts and Model* by Karen R. Polenske and *Modeling the Multiregional Economic System: Perspectives for the Eighties* edited by F. Gerard Adams and Norman J. Glickman. Single copies and subscriptions to *Growth and Change* are available from the Associate Editor, 644 Maxwelton Court, Lexington, Kentucky 40506.

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Kentucky County-Level Per Capita Personal Income, 1975-1979

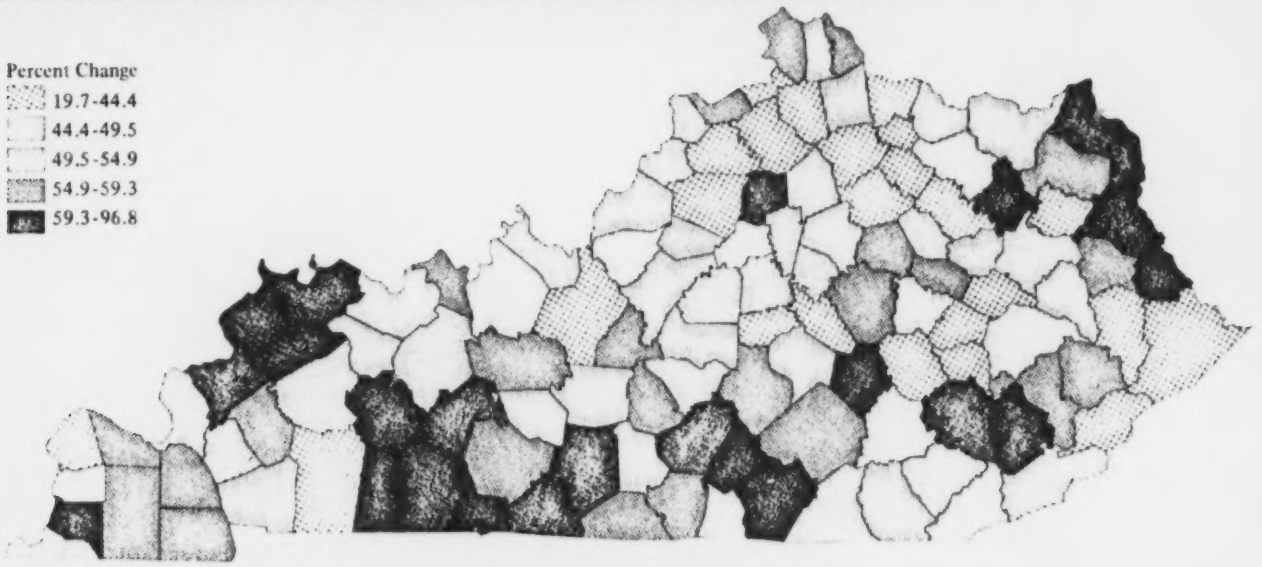
The following table lists the values for per capita Personal Income for each Kentucky county in 1975 and 1979, and shows the percentage change in these values for this period. This same information is graphically represented in the map on page 12, where each county is shaded according to the quintile appropriate to it.

County-level Personal Income data are estimated by the Regional Economic Measurement Division, Bureau of Economic Analysis, U.S. Department of Commerce. These data are stored in the CBANK of the Kentucky Economic Information System. The table was produced using KEIS program ADD3.

	1975	1979	PERCENT CHANGE 1975-79
[illegible]	3047.0	4875.0	59.99
[illegible]	3707.0	5990.0	61.59
ANDERSON	4883.0	7284.0	49.17
BALLARD	4521.0	6488.0	43.51
BARREN	4307.0	6866.0	59.41
BATH	3823.0	5358.0	40.15
BELL	4066.0	6193.0	52.31
BOONE	5189.0	8126.0	56.60
BOURBON	4894.0	7053.0	44.12
BOYD	5580.0	9251.0	65.79
BOYLE	5121.0	7259.0	41.75
BRACKEN	4096.0	5296.0	29.30
BREATHITT	2751.0	4107.0	49.29
BRECKINRIDGE	3783.0	5855.0	54.77
BULLITT	4175.0	6147.0	47.23
BUTLER	3243.0	5439.0	67.72
CALDWELL	4609.0	7231.0	56.89
CALLOWAY	3866.0	6114.0	58.15
CAMPBELL	5348.0	8435.0	57.72
CARLISLE	3998.0	6020.0	50.58
CARROLL	4552.0	7212.0	58.44
CARTER	3101.0	4821.0	55.47
CASEY	2666.0	4134.0	55.06
CHRISTIAN	4738.0	6632.0	39.97
CLARK	5271.0	8169.0	54.98
CLAY	2996.0	4876.0	62.75
CLINTON	2558.0	3784.0	47.93
CRITTENDEN	3968.0	6448.0	62.50
CUMBERLAND	3275.3	5133.0	56.73
DAVIESS	5436.0	8412.0	54.75
EDMONSON	3856.0	4515.0	52.15
ELLIOTT	3230.0	4779.0	52.48
ESTILL	3844.0	5826.0	51.56
FAYETTE	5845.0	8856.0	51.51
FLEMING	3521.0	5166.0	46.72
FLOYD	4430.0	6106.0	37.83
FRANKLIN	5688.0	9537.0	67.67
FULTON	4468.0	6679.0	49.49
GALLATIN	3813.0	5377.0	41.02
GARRARD	4296.0	6740.0	43.53
GRANT	4484.0	6469.0	44.27
GRAVES	4697.0	7290.0	55.21
GRAYSON	3606.0	5627.0	55.99
GREEN	3617.0	5716.0	58.11
GREENUP	4425.0	7156.0	61.72
HANCOCK	4304.0	6776.0	59.12
HARDIN	5129.6	7120.0	38.85
HARLAN	4554.0	6581.0	44.51
HARRISON	4094.3	7006.0	44.18
HART	3[illegible]	5251.0	49.46
HENDERSON	5360.0	8610.0	60.75
HENRY	4137.0	6665.0	40.70
HICKMAN	3770.0	6095.0	61.79
HOPKINS	6122.0	9150.0	47.69
JACKSON	2833.0	4036.0	42.46
JEFFERSON	6131.0	9266.0	51.13
JESSAMINE	4137.0	6020.0	45.52
JOHNSON	4194.0	6679.0	59.25
KENTON	5[illegible]3.0	9435.0	51.93
KNOTT	3051.0	4830.0	58.31
KNOX	3209.0	4787.0	49.17
LARUE	3[illegible]5.0	5115.0	52.35
LAUREL	4[illegible]9.0	5712.0	46.88
LAWRENCE	3981.0	6787.0	63.01
LEE	2[illegible]9.0	4175.0	44.25
LESLIE	3060.0	4959.0	62.19
LETCHER	4767.0	5945.0	24.71
LEWIS	4[illegible]3.0	4676.0	54.51
LINCOLN	3424.0	5269.0	53.82
LIVINGSTON	4[illegible]6.0	6925.0	51.64
LOGAN	4026.0	7155.0	77.72
LYON	4101.0	6075.0	48.13
MCCRACKEN	5219.0	8169.0	56.52
MCCREARY	2467.0	3592.0	45.60
MCLEAN	4471.0	6765.0	51.31
MADISON	4017.0	6293.0	56.66
MAGOFFIN	3068.0	4680.0	52.54
MARION	3429.0	5165.0	50.63
MARSHALL	4511.0	7128.0	58.01
MARTIN	4129.0	3085.0	95.81
MASON	4926.0	7162.0	45.39
MEADE	3427.0	5086.0	48.41
MENIFEE	2729.0	4303.0	54.84
MERCER	4689.0	6850.0	46.09
METCALFE	3001.0	4609.0	53.58
MONROE	3084.0	4863.0	57.68
MONTGOMERY	4446.0	6593.0	48.29
MORGAN	3060.0	4458.0	45.69
MUHLENBERG	4977.0	7939.0	59.51
NELSON	4287.0	6553.0	52.86
NICHOLAS	4189.0	5739.0	37.00
OHIO	4730.0	6962.0	47.19
OLDHAM	4834.0	7004.0	44.89
OWEN	4150.0	5469.0	31.78
OWSLEY	2435.0	3411.0	37.26
PENDLETON	4130.0	6200.0	50.12
PERRY	4502.0	7039.0	56.35
PIKE	5259.0	7357.0	39.51
POWELL	5330.0	8241.0	54.99
PULASKI	5740.0	9054.0	58.91
ROBERTSON	5869.0	4670.0	20.76
ROCKCASTLE	2656.0	4296.0	61.52
ROWAN	4311.0	5807.0	65.39
RUSSELL	4504.0	7110.0	57.74
SCOTT	4686.0	6824.0	45.56
SHELBY	5056.0	7288.0	44.15
SIMPSON	4379.0	7617.0	73.94
SPENCER	4298.0	6700.0	55.56
TAYLOR	4425.0	6528.0	47.48
TODD	3694.0	6019.0	62.94
TRIGG	4115.0	6350.0	54.51
TRIMBLE	5834.0	5672.0	48.33
UNION	4552.0	7285.0	60.04
WARREN	4776.0	7421.0	55.38
WASHINGTON	3556.0	5290.0	48.76
WAYNE	2655.0	4349.0	63.80
WEBSTER	5004.0	8230.0	64.65
WHITLEY	4282.0	6344.0	48.27
WOLFE	2856.0	4021.0	40.79
WOODFORD	5634.0	8267.0	46.73
PURCHASE ADD NO.1	4655.7	7215.9	55.68
PENNYRILE ADD NO.2	4955.9	7345.2	49.42
GREEN RIVER ADD NO.3	5145.4	8025.4	56.28
BARREN RIVER ADD NO.4	4070.4	6543.7	60.76
LINCOLN TRAIL ADD NO.5	4302.9	6281.5	45.98
KENTUCKY LAKE ADD NO.6	5943.2	8895.5	49.64
NORTHERN KENTUCKY ADD NO.7	5261.9	8070.5	53.37
BLUEGRASS ADD NO.8	5966.5	8611.0	43.99
GATEWAY ADD NO.9	5635.1	8889.2	57.77
RIVER ADD NO.10	4523.6	7331.8	62.08
BIG SANDY ADD NO.11	4648.5	6772.1	45.68
KENTUCKY RIVER ADD NO.12	5698.5	8466.0	45.09
CUMBERLAND VALLEY ADD NO.13	3785.7	5672.1	49.83
LAKE CUMBERLAND ADD NO.14	4298.2	5151.8	56.20
BLUEGRASS ADD NO.15	5115.4	7756.0	51.23
KENTUCKY	4882.0	[illegible]	51.11

SOURCE: BUREAU OF ECON ANALYSIS, US DEPT COMMERCE BY INFO ECON SYS

PERCENTAGE CHANGE IN COUNTY-LEVEL PER CAPITA PERSONAL INCOME, 1975-79



The calculation of percentage change in per capita Personal Income was done by software of the Kentucky Economic Information System (KEIS). The data from which these calculations were made are stored in the CBANK of the KEIS.

The map was produced on the ZETA plotter at the University of Kentucky Computing Center using the Kentucky Analytical Mapping System (KYAMS). For further information about an interface between the KEIS and KYAMS, contact Roy Sigafus (606-258-4626). See also the March 1981 issue of *Kentucky Economy: Review & Perspective*, p. 16.

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THE KENTUCKY COUNCIL OF ECONOMIC ADVISORS
University of Kentucky, Lexington, Kentucky 40506

September 1981
Vol. 5, No. 3

KCEA Review and Forecast

by Charles W. Hultman*

Although the growth of real gross national product (GNP) during the first quarter of 1981 at an annual rate of 8.6 percent was even higher than originally expected, second quarter activity was less than expected; real GNP declined at an annual rate of 1.6 percent. Some economists anticipate another small decline in real output during the third quarter; this implies at least the possibility of the second recession in as many years although this depends, in part, on the pervasiveness of the decline. The decrease of the Composite Index of Leading Indicators by 0.7 percentage points in August, following the decline in earlier months, reinforces the belief that the economy will remain sluggish for at least much of the remainder of 1981.

Recent developments, particularly the 15.2 percent annual inflation rate for July, as measured by the seasonally adjusted Consumer Price Index, a pledge on the part of the Reagan administration to hold the federal deficit to $42.5 billion during fiscal 1982, and continuing high interest rates continue to create concern in construction, automobile and related industries, and among small businessmen.

Although real output at the national level grew at a high rate in early 1981, this was, in part, the result of a favorable export situation and did not help the Kentucky economy to any appreciable extent. In fact Kentucky started the year with one of the highest unemployment rates ever recorded for the state. It appears that the Kentucky economy was affected by the 1980 decline more adversely (in comparison with the national economy) than it was by the recession of 1974-75. Industrialization that has occurred in the Commonwealth in recent years has helped raise per capita income in the state but also has made the state increasingly subject to national economic fluctuations.

Kentucky has been hit particularly hard during the past year and a half by high interest rates and scarcity of consumer credit. The two sectors of the state economy affected most directly and severely in Kentucky were construction and auto-related industries–sectors very much dependent on borrowed funds. Subsequently, other closely related fields, particularly in the durable goods industry, were affected adversely. The reduced level of activity also has had a serious impact on state tax revenues and consequently on state spending.

Recent developments suggest some improvement in the state economy. In July of 1981, the estimated unemployment rate in Kentucky was 7.2 percent, the lowest in about a year and a half, and slightly below the national figure of 7.3 percent. There is some evidence, however, that Kentucky has a substantial number of "discouraged" unemployed persons who have practically given up trying to find a job and who accordingly are not included among the official count of unemployment.

Another indication of slight improvement in the state economic picture is the decline in the insured unemployment rate. For the past several weeks, this has stood at about 3.6 percent, almost 2 percentage points below the figures for comparable weeks in 1980. Because of the decline in the insured unemployment rate, the extended benefits program which went into effect in May of 1980 was triggered off in July of 1981. Although part of this is due to a larger number of persons exhausting their benefit entitlements in 1981, there is some evidence of improvement in certain sectors of the Kentucky economy.

The Kentucky Quarterly Econometric Model (dated September 1, 1981) projects a decline in real personal income of less than 1 percent for 1981 and growth of about 3.7 percent in 1982. Total nonagricultural employment is predicted to be lower in 1981 than in 1980; a substantial portion of this decline is in coal mining and reflects the spring 1981 coal strike. Rather substantial declines are also forecast for contract construction and government. Manufacturing of both durable and nondurable goods is shown to decline slightly in 1981 but to expand in 1982.

The most important factor affecting developments at the state and national level relates to monetary conditions–the availability and cost of borrowed funds. A restrictive policy is likely to ease inflationary pressures somewhat, but at least in the short run creates structural distortions and reduced activity in those sectors and among those firms heavily dependent upon borrowed funds.

Charles W. Hultman is the Chairman of the KCEA.

Dr. Charles G. Renfro, Executive Director of the Kentucky Council of Economic Advisors (KCEA) and Director of the Center for Applied Economic Research (CAER), University of Kentucky, has submitted his resignation, effective October 1, 1981. On that date he will become Senior Economist and Director of Regional Forecasting for Chase Econometrics, Bala Cynwyd, Pennsylvania.

Since coming to the University of Kentucky in 1973 and joining the staff of the KCEA, Dr. Renfro has formally, as well as informally, provided economic advice and counsel for state government policy makers, agency personnel, legislators and congressional representatives, university officials, Kentucky businessmen, the media and others. His work has been organized around several interrelated projects: development of his Kentucky Quarterly Econometric Model (KQEM), participation in and direction of the construction of a consumer price index for Louisville and Lexington (1973-76), development of the Kentucky Economic Information System (KEIS), and expansion of the publication program of the KCEA and CAER.

Dr. Renfro has made a significant contribution towards a comprehensive understanding of the characteristics of the Kentucky economy and to a great extent, his work has become synonymous with that of the KCEA. Dr. Renfro's critiques of the performance of the U.S. and Kentucky economies have educated many and the forecasts from his model have been widely utilized. The KEIS, a public online economic database system developed primarily by him, is used for a variety of economic research and analysis purposes by persons throughout the Commonwealth.

An indication of the recognition that Dr. Renfro has received for his work came in 1980 when he was invited to become editor of the *Review of Public Data Use* (RPDU), a quarterly journal that is concerned with all aspects of the production, distribution, and use of economic and social data. He became editor of RPDU with the issue for December 1980 (Volume 8, Number 4).

We wish Dr. Renfro well and as a tribute to him we have included, on page 15, a selected bibliography of articles related to the Kentucky Economic Information System.

* * *

Paul A. Coomes, Assistant Director for Economic Studies and Analysis of the KCEA and CAER, has also resigned and is presently at the University of Texas, Austin, pursuing a doctorate in Economics. During this most recent tenure on the staff, Mr. Coomes worked on the externally funded projects undertaken by the Center: a study to analyze the impact of increased user fees on waterborne transportation undertaken by Dr. Charles Renfro, Dr. John Bernardo of the Department of Business Administration at the University of Kentucky, and Mr. Coomes; development of a local government financial computer databank undertaken by Mr. Coomes with Roy A. Sigafus, KCEA senior systems analyst/programmer. In addition, he collaborated with Dr. Renfro on analysis of the Kentucky economy for the publications of the KCEA. As is his nature, Paul Coomes approached all of these tasks with the energetic zeal that is certain to bring him continued success.

* * *

(continued on page 16)

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This publication is intended, primarily, to provide forecasts and current information concerning the Kentucky economy. More generally it provides a forum for the publication of short, expository articles dealing with analysis, research, or information systems, the focus of which is some aspect of the Kentucky economy.

Articles submitted for publication should be sent to the Editor at the address given above. All submissions will be reviewed independently by persons recognized as knowledgeable in the specific subject discussed. However, the ultimate responsibility for content rests with the author.

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Kentucky Econometric Model Forecast

by Charles G. Renfro*

This forecast for Kentucky is based upon the July 29, 1981 *Pre-Meeting Control Forecast* made by the Wharton Econometric Forecasting Associates, using the Wharton Quarterly Econometric Model of the United States (Mark 5.10). The Wharton Forecast is for virtually no growth in the third quarter of 1981, following a decline in real GNP during the second quarter. The end of the coal strike in June is expected however to boost output, and the increases received by Social Security recipients in July should help consumer expenditures. By the fourth quarter of 1981, the economy is expected to be recovering, with the recently enacted tax reductions helping to increase both consumer spending and business spending for plant and equipment. Nonetheless this growth is expected to be moderated by continuing sluggishness of exports and the continuation of high interest rates is expected to check the growth of the housing industry and purchase of consumer durables. Interest rates are expected to be higher during the third and fourth quarters of 1981, before beginning to decline in mid-1982.

The implications for Kentucky of this national forecast are shown in the tables on this page and pages 4 and 5. They include some rise in nonagricultural wage and salary employment through 1981 and 1982. However, the forecast indicates weak growth in personal income, and generally some degree of weakness in the performance of the Kentucky economy, principally as a result of the prevailing high national interest rates.

Charles G. Renfro is Executive Director of the Kentucky Council of Economic Advisors.

ANNUAL SUMMARY TABLE
SELECTED ECONOMIC INDICATORS

Description	1980	1981	1982
Personal Income (Millions)	28498.1	30877.3	34888.7
% Chg.: Ky. Personal Income	8.99	8.35	12.99
Real Personal Income (Millions 1972 $)	15931.5	15833.0	16420.8
% Chg.: Ky. Real Personal Income	-1.08	-0.62	3.71
Wage and Salary Disbursement	16847.5	17890.5	20914.7
Mfg. Wage & Salaries	4592.1	5070.7	6011.3
Non-Mfg. Wage & Salaries	12255.4	12819.9	14903.4
Non-Agri. Wage & Salary Employment (Thousands)	1208.1	1192.6	1233.6
% Chg.: Ky. Non-Agri. Employment	-3.03	-1.28	3.43
Manufacturing Employment	276.5	275.2	283.4
Durable Goods	153.6	152.6	157.4
Non-Durable Goods	122.9	122.6	126.0
Non-Mfg., Non-Agri. Employment	931.6	917.4	950.2
Civilian Labor Force (Thousands)	1563.9	1536.2	1575.0
Ky. Unemployment Rate (%)	8.9	7.8	6.7

Forecast Date: September 1, 1981.

This forecast should be regarded as simply suggesting the effect on Kentucky if the July 29 Wharton National Forecast were to be realized. It is also important to note that, in the forecast tables, all the figures shown for 1980 and 1981 are *forecasts*, as explained in the technical note on page 9 of the September 1980 *Review & Perspective*.

QUARTERLY FORECAST TABLE
SELECTED ECONOMIC INDICATORS

Description	1981.1	1981.2	1981.3	1981.4	1982.1	1982.2	1982.3	1982.4
Personal Income (Millions)	29950.7	29718.1	31260.9	32579.3	33480.1	34218.1	35441.7	36414.7
% Chg.: Ky. Personal Income	6.42	-3.07	22.44	17.97	11.53	9.11	15.09	11.44
Real Personal Income (Millions 1972 $)	15889.0	15390.0	15868.5	16184.5	16284.1	16278.9	16507.5	16612.6
% Chg.: Ky. Real Personal Income	-1.26	-11.98	13.03	8.21	2.48	-0.13	5.74	2.57
Wage and Salary Disbursement	17505.2	17034.4	18033.0	18989.5	20047.6	20530.3	21239.7	21841.0
Mfg. Wage & Salaries	4865.4	4994.9	5107.2	5315.2	5750.2	5947.0	6108.8	6239.3
Non-Mfg. Wage & Salaries	12639.8	12039.6	12925.9	13674.3	14297.4	14583.4	15130.9	15601.7
Non-Agri. Wage & Salary Employment (Thousands)	1194.9	1168.0	1194.6	1213.0	1224.8	1231.8	1235.1	1242.7
% Chg.: Ky. Non-Agri. Employment	0.27	-8.70	9.43	6.28	3.96	2.30	1.08	2.48
Manufacturing Employment	273.3	272.1	275.9	279.5	281.5	283.1	284.1	284.7
Durable Goods	152.5	151.5	152.4	154.1	155.8	157.5	158.0	158.2
Non-Durable Goods	120.8	120.6	123.5	125.4	125.8	125.7	126.1	126.5
Non-Mfg., Non-Agri. Employment	921.6	895.9	918.7	933.4	943.3	948.7	951.0	958.0
Civilian Labor Force (Thousands)	1533.7	1526.8	1535.0	1549.3	1563.8	1570.7	1577.4	1587.9
Ky. Unemployment Rate (%)	8.2	7.9	7.7	7.4	7.0	6.8	6.6	6.5

Forecast Date: September 1, 1981.

ABLE COPY

KENTUCKY QUARTERLY ECONOMETRIC MODEL

PERSONAL INCOME

DESCRIPTION	FORECAST DATA 1981.1	1981.2	1981.3	1981.4	1982.1	1982.2	1982.3	1982.4	ANNUAL 1980	1981	1982
PERSONAL INCOME (MILLIONS)	29950.7	29718.1	31260.9	32579.3	33480.1	34218.1	35441.7	36414.7	28498.1	30877.3	34888.7
WAGE & SALARY DISBURSEMENTS	17505.2	17034.4	18033.0	18989.5	20047.6	20530.3	21239.7	21841.0	16847.5	17890.5	20914.7
NON-AGRI. WAGES & SALARIES	17358.1	16880.4	17882.3	18841.7	19843.4	20325.0	21036.6	21640.3	16716.6	17740.6	20711.3
MANUFACTURING	4865.4	4994.9	5107.2	5315.2	5750.2	5947.0	6108.8	6239.3	4592.1	5070.7	6011.3
DURABLE GOODS	2856.2	2871.1	2912.8	2965.0	3247.5	3337.6	3453.9	3478.5	2639.7	2901.3	3379.4
NON-DURABLE GOODS	2009.3	2123.7	2194.4	2350.3	2502.6	2609.4	2654.9	2760.8	1952.4	2169.4	2631.9
MINING	1332.9	597.6	1061.9	1415.0	1460.9	1516.9	1572.9	1638.5	1385.9	1101.8	1547.3
COAL MINING	1240.0	509.7	966.2	1305.9	1346.8	1399.3	1451.4	1512.4	1306.6	1005.4	1427.5
OTHER MINING	92.9	87.8	95.7	109.1	114.1	117.6	121.5	126.1	79.3	96.4	119.8
CONTRACT CONSTRUCTION	758.8	732.5	862.5	970.4	891.5	880.1	1002.3	1073.7	911.5	831.1	961.9
REGULATED INDUSTRIES	1472.0	1453.2	1502.4	1546.6	1626.0	1631.7	1722.2	1749.5	1358.0	1493.5	1682.3
WHOLESALE & RETAIL TRADE	2828.6	2862.8	2976.5	3093.3	3333.3	3415.6	3514.9	3611.0	2653.4	2940.3	3468.7
SERVICES	2344.0	2431.8	2496.4	2568.1	2681.2	2785.0	2899.2	3015.1	2206.8	2460.1	2845.1
FINANCE, INS. & REAL ESTATE	710.4	729.8	762.0	771.1	791.1	799.6	842.8	862.3	629.8	743.3	824.0
GOVERNMENT	3046.1	3078.0	3113.5	3161.9	3309.3	3349.4	3373.6	3450.8	2979.1	3099.9	3370.8
CIVILIAN GOVERNMENT	2502.1	2517.0	2531.5	2574.9	2694.3	2727.4	2747.6	2818.8	2455.3	2531.4	2747.0
FEDERAL CIVILIAN	665.5	677.0	685.3	711.3	732.5	750.8	750.7	792.8	651.0	684.8	756.7
STATE & LOC. GOV'T	1836.6	1840.0	1846.2	1863.6	1961.8	1976.6	1996.8	2026.1	1804.3	1846.6	1990.3
FEDERAL MILITARY	544.0	561.0	582.0	587.0	615.0	622.0	626.0	632.0	523.8	568.5	623.8
AGRICULTURAL WAGE & SALARY	147.0	154.0	150.7	147.9	204.2	205.3	203.1	200.7	130.8	149.9	203.3
OTHER LABOR INCOME	2248.0	2188.7	2378.7	2563.9	2754.3	2865.2	3022.6	3153.9	2089.6	2344.8	2949.0
PROPRIETORS NET INCOME	2540.9	2585.8	2603.2	2648.7	2751.7	2780.3	2824.9	2882.9	2499.5	2594.6	2809.9
NON-FARM	1952.9	1989.2	2058.7	2143.1	2217.6	2275.5	2343.5	2419.3	1963.4	2036.0	2314.0
FARM	588.0	596.6	544.5	505.6	534.0	504.8	481.4	463.6	536.1	558.7	495.9
RESIDENCE ADJUSTMENT	302.7	312.1	314.7	323.3	347.2	357.1	365.5	372.6	282.5	313.2	360.6
OTHER INCOME ITEMS	8711.3	8921.6	9314.5	9487.8	9123.9	9256.2	9602.4	9806.1	7974.1	9108.8	9447.2
PROPERTY INCOME	3970.2	4075.4	4183.1	4311.3	3900.9	3985.2	4083.2	4187.2	3591.8	4135.0	4039.1
TRANSFER PAYMENTS	4741.1	4846.2	5131.4	5176.5	5223.0	5271.0	5519.2	5618.9	4382.3	4973.8	5408.0
LESS: PERSONAL CONTRIBUTIONS FOR SOCIAL INSURANCE	1357.2	1324.5	1383.1	1433.9	1544.6	1571.0	1613.5	1641.8	1195.1	1374.7	1592.7

FORECAST DATE: SEPTEMBER 1,1981

KENTUCKY QUARTERLY ECONOMETRIC MODEL

EMPLOYMENT AND HOURS

DESCRIPTION	FORECAST DATA 1981.1	1981.2	1981.3	1981.4	1982.1	1982.2	1982.3	1982.4	ANNUAL 1980	1981	1982
EMPLOYMENT (THOUSANDS)											
TOTAL EMPLOYMENT (RES.ADJ.)	1407.7	1405.7	1416.8	1435.1	1453.8	1464.4	1473.2	1484.9	1425.1	1416.3	1469.1
NON-AGRI. EMPLOYMENT	1317.9	1291.2	1321.9	1345.6	1360.6	1372.1	1381.9	1394.6	1337.1	1319.2	1377.3
WAGE & SALARY EMPLOYMENT	1194.9	1168.0	1194.6	1213.0	1224.8	1231.8	1235.1	1242.7	1208.1	1192.6	1233.6
MANUFACTURING	273.3	272.1	275.9	279.5	281.5	283.1	284.1	284.7	276.5	275.2	283.4
DURABLE GOODS	152.5	151.5	152.4	154.1	155.8	157.5	158.0	158.2	153.6	152.6	157.4
NON-DURABLE GOODS	120.8	120.6	123.5	125.4	125.8	125.7	126.1	126.5	122.9	122.6	126.0
MINING	57.1	34.1	53.7	60.2	61.3	62.2	63.3	65.1	58.5	51.3	63.0
COAL MINING	51.3	27.5	46.7	53.1	54.2	55.1	56.0	57.7	53.5	44.7	55.7
OTHER	5.8	6.5	7.0	7.1	7.1	7.2	7.3	7.4	5.1	6.6	7.3
CONTRACT CONSTRUCTION	49.8	49.2	49.8	52.1	52.4	53.5	53.4	53.7	59.3	50.2	53.3
REGULATED INDUSTRIES	69.6	69.5	69.2	69.3	68.9	71.1	70.8	71.3	67.4	69.4	70.5
WHOLESALE & RETAIL TRADE	258.8	257.9	262.0	266.6	268.7	271.0	273.2	275.3	259.2	261.3	272.1
SERVICES	211.2	210.5	210.7	213.2	213.3	213.3	213.2	213.8	210.8	211.4	213.4
FINANCE, INSURANCE & REAL ESTATE	51.3	53.4	53.8	53.4	52.9	52.8	53.5	54.5	48.4	53.0	53.4
GOVERNMENT	223.8	221.5	219.5	218.6	225.7	224.7	223.5	224.1	228.1	220.8	224.5
FEDERAL	38.0	38.0	38.0	38.0	38.2	38.5	38.0	38.6	39.0	38.0	38.3
STATE & LOCAL	185.8	183.5	181.5	180.6	187.5	186.2	185.5	185.5	189.1	182.8	186.2
EDUCATION	108.8	107.3	106.1	106.0	113.6	113.1	113.1	113.9	110.1	107.0	113.4
OTHER	77.0	76.2	75.4	74.6	73.9	73.1	72.4	71.6	79.0	75.8	72.7
ALL OTHER NON-AG EMPL	123.0	123.2	127.3	132.6	135.8	140.3	146.9	152.0	129.0	126.5	143.8
AGRICULTURAL	72.8	73.6	73.3	72.5	76.2	75.3	74.2	73.2	71.0	73.1	74.7
HIRED WORKERS	21.4	21.8	21.2	20.3	24.4	24.0	23.3	22.7	20.3	21.2	23.6
FAMILY & OTHER UNPAID	51.4	51.8	52.1	52.2	51.7	51.3	50.9	50.6	50.7	51.9	51.1
HOURS & MANHOURS											
AVERAGE WEEKLY HOURS											
DURABLE MANUFACTURING	40.0	40.5	39.8	39.4	39.9	40.9	41.0	40.4	39.3	39.9	40.5
NON-DURABLE MANUFACTURING	40.0	40.0	40.0	40.0	40.2	40.6	39.7	39.8	40.1	40.0	40.1
MANHOURS											
TOTAL MANUFACTURING	5680.9	5697.8	5725.2	5765.8	5863.5	5999.3	5971.3	5939.8	5704.2	5717.4	5943.5
DURABLE GOODS	3167.7	3189.7	3156.6	3157.1	3234.7	3346.6	3367.8	3322.5	3143.0	3167.8	3317.9
NON-DURABLE GOODS	2513.2	2508.1	2568.5	2608.6	2628.8	2652.7	2603.4	2617.3	2561.3	2549.6	2625.6
DAYS & MAN-DAYS											
COAL MINING DAYS WORKED	49.4	37.2	40.9	47.8	47.5	47.8	47.9	47.7	52.0	43.8	47.7
COAL MINING MAN DAYS	10132.5	4096.1	7636.0	10150.5	10295.2	10519.9	10731.2	10997.9	11122.5	8003.8	10636.0
LABOR FORCE											
RESIDENT ADJUSTED LABOR FORCE	1533.7	1526.8	1535.0	1549.3	1563.8	1570.7	1577.4	1587.9	1563.9	1536.2	1575.0
UNEMPLOYMENT	126.0	121.1	118.2	114.2	110.0	106.3	104.2	103.0	138.8	119.9	105.9
UNEMPLOYMENT RATE (%)	8.2	7.9	7.7	7.4	7.0	6.8	6.6	6.5	8.9	7.8	6.7

FORECAST DATE: SEPTEMBER 1,1981

A Review of Kentucky Revenue for 1980-81 and a Forecast for 1981-82

by William B. Gardner II and Richard Thalheimer*

The Kentucky economy exhibited a generally stagnant, if not recessionary, growth pattern throughout fiscal 1980-81. The loudly heralded 8 percent growth in the national economy during the first quarter of calendar 1981 was largely due to a favorable export situation and did not affect the Kentucky economy. Uncharacteristically high unemployment, double digit inflation, record high interest rates, a coal strike, and a tax base increasingly unresponsive to economic growth, combined to produce one of the smallest revenue increases in the modern history of the state. From 1971-72 until 1979-80, Kentucky had not experienced a growth rate of less than 10 percent; fiscal 1977-78 and 1978-79 had in fact been years of 22.1 percent and 15.1 percent revenue growth, respectively. The exemption of residential utility usage from the sales tax base and a 4 percent limit on state general real property tax revenue increases, enacted by the 1979 Special Session of the Legislature, came into effect during the 1979-80 fiscal year. These revenue limiting provisions, combined with a severe national and state recession in the fourth quarter of fiscal 1979-80, accounted for the reported 4.9 percent growth rate in that fiscal year, the lowest in over 15 years.

The General Fund

In July 1980, it appeared that revenue growth prospects for the second half of the fiscal year warranted a General Fund growth projection of 7.8 percent for fiscal 1980-81. In January 1981, the picture was still muddled and it seemed that the economy was slowing rather than accelerating. We therefore revised our General Fund estimates downward to project only a 7.2 percent increase over 1979-80, for an estimate of $1.91 billion. Actual General Fund receipts for 1980-81 were $1.895 billion, an increase of 6.3 percent over 1979-80, and a shortfall of $15.135 million (0.8 percent) from our January 1981 estimates. It should be noted however that the reported total receipts for fiscal 1980-81 include $18.96 million in authorized 1980 individual income tax refunds, held for payment until July 1981.[1]

Much of this shortfall can be attributed to two sources—the coal strike and a decline in corporation income tax receipts. The January 1981 forecast was predicated on a one month coal strike assumption; however, the strike lasted somewhat more than two months. The direct effect of the strike on coal severance tax receipts and its indirect effect on individual income tax, corporation income tax, and sales tax receipts are estimated to account for $15 million of the shortfall.

William B. Gardner II is Research Advisor and Richard Thalheimer is Director of the Research Division, both of the Kentucky Department of Revenue.

The corporation income tax receipts were $20 million less than predicted. When the forecast was made in January 1981, corporation income tax receipts were running 11 percent ahead of receipts for the comparable period a year earlier. We expected that receipts for the second half of the fiscal year would be up from what they had been in the spring of 1980, since that had been the period of severe economic decline nationally. In retrospect, it appears as if the full magnitude of the effect of implementing the new federal corporate loss carryover provisions was severely underestimated. This provision, together with the proposed federal tax law changes and a deteriorating business environment, has caused corporations to dramatically reduce their expected tax liabilities. Corporate declaration payments in June 1981 were 10 percent below the level of June 1980.

Paradoxically it is the major revenue producers—the sales tax, income taxes, property taxes, and the severance taxes—that are becoming the least responsive to growth. The problems posed by a less responsive tax base are demonstrated by the fact that the increase in General Fund revenue was less than the 1980-81 estimated growth in personal income for the state (8 percent), which in turn was less than the growth of personal income for the nation (10 percent). Both of these relationships run counter to historical precedent yet are likely to continue in the future unless fundamental structural changes are enacted to alter the tax base.

The sales tax base has been reduced through the exemption of food and residential utilities sales. As these are the areas where inflation has been highest, the fraction of disposable income people have available for taxable purchases has been reduced. What was once a tax that generally grew as fast as inflation, now lags behind it. The individual income tax system has two features that limit responsiveness to inflation and income growth—full federal tax deductibility and a limited progressive structure with a top bracket of only $8,000. The corporation income tax, with its loss carryover and Sub-S provisions, has become less growth responsive, and the proposed federal depreciation allowance changes will further act to diminish the taxable base. House Bill 44 has effectively limited growth for real property tax receipts at the state level with its imposition of a 4 percent ceiling on revenue increases. Finally, the transfer of a predetermined amount of coal severance tax receipts from the General Fund to the Transportation Fund has served to retard growth in the General Fund.[2]

Given these considerations, the outlook for 1981-82 must be one of continuing restrained growth for the General Fund accounts. We generally perceive sluggish economic conditions, with Kentucky personal income growth remaining stable at a modest 8-9 percent annual rate while inflation moderates somewhat to an annual rate of about 9 percent, primarily due to a slowdown in world energy costs. Interest rates will continue to be high, but more importantly, the continued re-

TABLE 1

KENTUCKY DEPARTMENT OF REVENUE JULY 1981 AND PRIOR FORECASTS FOR 1981-82 GENERAL FUND REVENUES
(Millions of Dollars)

Tax	March 1980 Estimates for 1981-82	January 1981 Estimates for 1981-82	July 1981 Estimates for 1981-82	Actual 1980-81 Collections	Implied Growth Rate for 1981-82 (Percent)
Sales and Use	$ 775.00	$ 715.00	$ 680.00	$ 630.20	7.9%
Individual	727.00	615.00	611.00	544.13[1]	10.3
Corporation Income	192.00	192.00	145.00	154.79	(6.3)
Coal Severance	178.50[2]	178.50[2]	166.00	136.48[3]	21.6
Total Property Plus Inheritance	231.74	230.59	223.33	208.43	7.2
Subtotal	2,104.24	1,931.09	1,825.33	1,684.02	8.4
All Other	200.76	188.91	198.17	210.84[4]	NA
General Fund	$2,305.00	$2,120.00	$2,023.50	$1,894.86	6.8[5]

[1] Reported individual income tax receipts for 1980-81 were $573.10 million which includes $18.96 million in refunds held until July 1981.
[2] Total coal severance tax receipts (both the General and the Transportation Funds) for 1981-82 were estimated to be $222.3 million in March 1980, $221.3 million in January 1981 and $208.8 million in July 1981.
[3] Total coal severance tax receipts (both funds) for 1980-81 were $178.76 million or 1.4 percent greater than in 1979-80.
[4] Includes $18.96 million in income tax refunds held until July 1981.
[5] Growth in the General Fund would be 8.9 percent (after adjustments for refund delay).

straint exhibited by the federal monetary authorities, combined with a lessening of inflationary pressures, should minimize the possibility of adverse economic shocks from this source. Some relief in interest rates may be felt by the second half of the fiscal year.

Table 1 outlines the estimates for 1981-82 General Fund revenues made in March 1980, January 1981, and July 1981. As is shown, our point estimate for 1981-82 from all major General Fund taxes is $2.02 billion; this represents an 8.9 percent growth rate over 1980-81 actual receipts. Actual receipts for 1980-81 and implied growth rates for each of the major General Fund taxes are also shown in this table.

Our estimate for 1981-82 does not include the full effect of anticipated federal budget cuts. There is no historical relationship that adequately describes the effects of cuts of the magnitude anticipated. Specifically, the effect of accelerated depreciation rules and individual income tax cuts has not been fully determined at the federal level. For these reasons we feel that the uncertainty attached to our 1981-82 estimate is greater than usual, with the downside risks greater than the upside risks. Although moderate inflation and a decline in interest rates could cause our forecast to be exceeded, the chances of this are much less than the likely negative effects of the federal budget cuts to come later in the year. We will again track our forecast each quarter and revise it in light of additional information if it is deemed necessary.

The Transportation Fund

Transportation Fund receipts declined 0.6 percent in 1980-81 to $361.4 million, $1.64 million, or 0.5 percent short of our January 1981 estimate. This level of accuracy was achieved in a year in which gasoline consumption declined by 5.3 percent, retail car sales remained depressed throughout, and the wholesale price of gasoline failed to pierce the $1.00 floor until the survey period for determining the price for the fourth fiscal quarter.

We now forecast 1981-82 Transportation Fund revenues to total $390.4 million, an increase of 8 percent, but an additional $8.6 million shortfall from the January 1981 estimate, and $81 million below the original March 1980 budget estimate. Current and prior estimates for the Transportation Fund and its major components are given in Table 2, along with implied growth rates for these components. Much of the projected increase in Transportation Fund revenues for 1981-82 is attributable to the growth projected for the motor fuels normal tax and the motor vehicle usage tax, the major components of the Transportation Fund.

Motor fuels normal tax receipts are forecast to total $186 million for 1981-82, a 7.8 percent growth rate. Net gasoline consumption in Kentucky is assumed to decline 3.8 percent for the year; the estimate of revenue growth is attributable to implementation of the 9 percent tax on the wholesale price of gasoline. The wholesale price of gasoline for the first fiscal quarter of 1982 has been established at $1.15. We assume that gasoline prices are now declining at about 1 cent a month in response to the current market glut, but will soon bottom out, increasing gradually throughout the balance of the fiscal year. Our forecast of the wholesale price of gasoline for the last three quarters is $1.12, $1.15, and $1.20. We foresee that there will be an 8 percent increase in the number of taxable automobile sales and project a 10 percent increase in average car prices. These assumptions lead to a forecasted $104.1 million in motor vehicle usage tax receipts.

Since the actual 1980-81 Transportation Fund revenues were within 2.3 percent of our July 1980 estimate and less than 0.5 percent off from our January 1981 estimate, we feel that risks to this forecast are less than that to the General

(continued on page 10)

selected indicators OF ECONOMIC A

These tables of selected indicators of economic activity were prepared by a special-purpose program of the Kentucky Economic Information System. The data in the tables are reported figures which were obtained from a variety of state and federal agencies, as well as from private firms.

UNITED STATES DATA

	Apr. 1981	May 1981	June 1981	Qtr. II 1981	% Chg. 81-I 81-II	% Chg. 80-II 81-II
CONSUMER PRICE INDEXES (1967=100, NOT SEASONALLY ADJUSTED)						
CONSUMER PRICE INDEX, ALL URBAN CONSUMERS (CPI-U), ALL ITEMS	266.80	269.00	271.30	269.03	2.32	9.81
CONSUMER PRICE INDEX, ALL URBAN CONSUMERS (CPI-U), FOOD AND BEVER	265.70	265.40	266.50	265.87	0.95	8.87
CONSUMER PRICE INDEX, ALL URBAN CONSUMERS (CPI-U), HOUSING	284.80	288.50	292.20	288.50	2.72	10.07
CONSUMER PRICE INDEX, ALL URBAN CONSUMERS (CPI-U), APPAR & UPKEEP	186.40	186.40	185.80	186.20	1.90	5.00
CONSUMER PRICE INDEX, ALL URBAN CONSUMERS (CPI-U), TRANSPORTATION	275.30	277.80	279.90	277.67	2.95	11.74
CONSUMER PRICE INDEX, ALL URBAN CONSUMERS (CPI-U), MEDICAL	287.00	289.00	291.50	289.17	2.44	9.80
CONSUMER PRICE INDEX, ALL URBAN CONSUMERS (CPI-U), ENTERTAINMENT	219.20	220.30	220.80	220.10	1.69	7.93
CONSUMER PRICE INDEX, ALL URBAN CONSUMERS (CPI-U), OTHER	229.90	232.20	233.40	231.83	1.93	9.79
CONSUMER PRICE INDEX (CPI-U), SPECIAL INDEX: ENERGY	409.80	411.30	414.00	411.70	3.61	13.33
PRODUCER PRICE INDEXES (1967=100, NOT SEASONALLY ADJUSTED)						
PRODUCER PRICE INDEX, ALL FINISHED GOODS	268.50	268.90	269.90	269.10	2.23	10.53
PRODUCER PRICE INDEX, FINISHED CONSUMER GOODS	270.60	270.60	271.50	270.90	2.20	10.47
PRODUCER PRICE INDEX, INTERMEDIATE MATERIALS	305.80	306.60	307.10	306.50	2.57	10.58
PRODUCER PRICE INDEX, INTERMEDIATE MATERIALS FOR MANUFACTURING	284.10	285.00	285.80	284.97	1.58	8.57
PRODUCER PRICE INDEX, CRUDE MATERIALS	336.30	333.20	334.30	334.60	0.51	16.19
PRODUCER PRICE INDEX, CRUDE FOODSTUFFS AND FEEDSTUFFS	263.50	260.60	264.20	262.77	-1.45	9.21
PRODUCER PRICE INDEX, BITUM. COAL, INDUSTRIAL,SPOT(1967=100)	403.60	405.00	412.00	406.87	1.65	3.20
PRODUCER PRICE INDEX, BITUM. COAL, INDUSTRIAL,CONTRACT(JUNE76=100)	138.10	138.30	139.00	138.47	1.76	4.71
CONSUMER PRICES: ENERGY (U.S. CITY AVERAGE)						
AVG PRICE FOR UTILITY (PIPED) GAS, PER 40 THERMS	18.52	19.22	19.28	19.01	5.07	13.49
AVG PRICE FOR UTILITY (PIPED) GAS, PER 100 THERMS	41.50	44.99	45.04	43.84	8.33	15.55
AVG PRICE FOR ELECTRICITY, PER 500 KWH	32.85	33.10	34.96	33.64	4.98	14.25
AVG PRICE FOR FUEL OIL #2 (HOME HEATING OIL), PER GALLON	1.28	1.27	1.26	1.27	2.86	25.28
AVG PRICE, GASOLINE, ALL TYPES, PER GALLON	1.38	1.37	1.36	1.37	2.57	10.21
AVG PRICE, GASOLINE, LEADED REGULAR, PER GALLON	1.34	1.33	1.32	1.33	2.30	9.80
AVG PRICE, GASOLINE, UNLEADED REGULAR, PER GALLON	1.41	1.40	1.39	1.40	2.59	10.63
AVG PRICE, GASOLINE, LEADED PREMIUM, PER GALLON	1.45	1.45	1.45	1.45	3.50	11.76
LABOR FORCE (SEASONALLY ADJUSTED)						
LABOR FORCE, CIVILIAN (MILLIONS)	106.72	107.41	106.18	106.77	0.91	1.98
EMPLOYMENT, TOTAL (MILLIONS)	98.98	99.23	98.39	98.87	0.87	1.88
EMPLOYMENT, AGRICULTURE	3.46	3.35	3.26	3.36	1.21	2.39
EMPLOYMENT, NONAGRICULTURAL INDUSTRIES	95.51	95.88	95.13	95.51	0.86	1.87
UNEMPLOYMENT RATE, TOTAL	7.30	7.60	7.30	7.40	0.91	0.91
UNEMPLOYMENT RATE, BLACKS & OTHER RACIAL MINORITIES	13.20	13.60	14.20	13.67	3.27	3.27
OTHER SELECTED NATIONAL INDICATORS:						
U.S. GROSS NATIONAL PRODUCT (B $) (% CHG AT ANNUAL RATE)	NA	NA	NA	2885.80	4.70	12.52
U.S. REAL GROSS NATIONAL PRODUCT (B 72$) (% CHG AT ANNUAL RATE)	NA	NA	NA	1510.40	-1.60	3.22
PERSONAL INCOME, TOTAL, SEASONALLY ADJUSTED (B $)	2353.80	2367.40	2384.30	2368.50	8.67	12.01
COMPOSITE INDEX OF 12 LEADING INDICATORS (1967=100)	137.40	135.20	133.90	135.50	-0.10	8.95
INDEX OF INDUSTRIAL PRODUCTION, SEASONALLY ADJUSTED (1967=100)	152.20	153.00	152.90	152.70	0.59	5.60
INTEREST RATE, YIELD ON 3-MONTH TREASURY BILLS	13.63	16.30	14.56	14.83	3.20	47.57
PRIVATE HOUSING UNITS AUTH. 16000 PERMIT-ISSUING PLACES (SADJ THOU)	1186.00	1167.00	963.00	3316.00	-22.02	19.19
TOTAL INSTALLMENT CREDIT OUTSTANDING AT END OF MONTH (B $)	313.42	315.46	318.46	315.78	1.81	3.19

CTIVITY

KENTUCKY DATA

	Apr. 1981	May 1981	June 1981	Qtr. II 1981	% Chg. 81-I 81-II	%Chg. 80-II 81-II
LABOR FORCE (NOT SEASONALLY ADJUSTED, THOUSANDS)						
LABOR FORCE, TOTAL CIVILIAN	1614.70	1631.40	1674.00	1640.03	0.66	-0.03
EMPLOYMENT, TOTAL, BY PLACE OF RESIDENCE	1481.10	1508.10	1548.20	1512.47	3.04	0.28
EMPLOYMENT, AGRICULTURAL	59.00	66.60	80.60	68.73	37.74	-2.69
EMPLOYMENT, TOTAL NON-AGRICULTURAL	1422.10	1441.50	1467.60	1443.73	1.82	2.35
UNEMPLOYMENT RATE	8.30	7.60	7.50	7.78	-21.51	-3.54
EMPLOYMENT, TOTAL NON-AGRICULTURAL WAGE AND SALARY	1177.60	1178.70	1191.80	1182.70	-1.40	-3.05
EMPLOYMENT, BITUMINOUS COAL & LIGNITE MINING (SIC 12)	23.80	23.30	35.00	27.37	-46.72	-42.95
EMPLOYMENT, CONTRACT CONSTRUCTION	54.10	55.00	57.10	55.40	12.22	-5.51
EMPLOYMENT, TOTAL MANUFACTURING	273.50	275.60	277.30	275.47	0.45	-0.85
EMPLOYMENT, MANUFACTURING, DURABLE	155.50	156.90	157.60	156.67	1.38	-0.32
EMPLOYMENT, MANUFACTURING, NON-DURABLE	118.00	118.70	119.70	118.80	-0.75	-1.55
EMPLOYMENT, TRANSPORTATION, COMMUNICATIONS & PUBLIC UTILITIES	66.90	67.40	67.20	67.17	-0.44	-3.17
EMPLOYMENT, WHOLESALE & RETAIL TRADE	254.70	254.20	256.60	255.17	-1.26	-1.66
EMPLOYMENT, FINANCE, INSURANCE & REAL ESTATE (SIC 60-67)	52.40	52.70	53.20	52.77	1.41	1.09
EMPLOYMENT, SERVICES (SIC 70-80)	211.80	212.50	214.10	212.80	2.88	0.85
EMPLOYMENT, CIVILIAN GOVERNMENT	235.60	233.00	226.20	231.60	-1.66	-2.74
EMPLOYMENT, STATE & LOCAL GOVERNMENT	191.30	188.80	181.80	187.30	-2.09	-3.14
HOURS AND EARNINGS OF PRODUCTION WORKERS IN MANUFACTURING						
AVG WEEKLY HOURS, PROD WORKERS, TOTAL MANUFACTURING	39.50	40.00	39.90	39.80	0.17	3.02
AVG WEEKLY HOURS, PROD WORKERS, MANUFACTURING DURABLES	40.20	40.40	40.30	40.30	0.17	4.31
AVG WEEKLY HOURS, PROD WORKERS, NON-DURABLE MANUFACTURING	38.60	39.40	39.50	39.17	0.17	1.47
AVG HOURLY EARN, PROD WORKERS, TOTAL MANUFACTURING	7.79	7.77	7.89	7.82	2.05	7.92
AVG HOURLY EARN, PROD WORKERS, MANUFACTURING DURABLES	8.38	8.40	8.52	8.43	1.89	9.15
AVG HOURLY EARN, PROD WORKERS, NON-DURABLE MANUFACTURING	6.99	6.91	7.05	6.98	2.15	5.54
AVG WEEKLY EARN, PROD WORKERS, TOTAL MANUFACTURING	307.71	310.80	314.81	311.11	2.22	11.18
AVG WEEKLY EARN, PROD WORKERS, MANUFACTURING DURABLES	336.88	339.36	343.31	339.85	2.06	13.86
AVG WEEKLY EARN, PROD WORKERS, NON-DURABLE MANUFACTURING	269.81	272.25	278.48	273.51	2.32	7.09
INDEX OF PRICES RECEIVED BY KY FARMERS (1972=100)						
INDEX OF PRICES REC'D BY KY FARMERS, CROP AND LIVESTOCK PRODUCTS	181.57	180.24	181.88	181.23	0.59	9.94
INDEX OF PRICES REC'D BY KY FARMERS, LIVESTOCK PRODUCTS	158.62	155.20	159.71	157.85	1.95	2.68
INDEX OF PRICES REC'D BY KY FARMERS, CROPS	195.96	195.95	195.80	195.91	-0.08	14.03
MINING (MILLIONS OF TONS, MILLIONS OF TAX DOLLARS)						
BITUMINOUS COAL & LIGNITE, PHYSICAL OUTPUT, EASTERN KY, TOTAL	5.35	4.22	8.41	17.98	-34.75	-37.13
BITUMINOUS COAL & LIGNITE, PHYSICAL OUTPUT, WESTERN KY, TOTAL	2.25	2.19	3.39	7.82	-26.83	-28.90
AVG HOURLY EARN, PROD WORKERS, BITUMINOUS COAL & LIGNITE MINING	11.11	11.71	12.64	11.82	-11.26	3.87
AVG WEEKLY EARN, PROD WORKERS, BITUMINOUS COAL & LIGNITE MINING	365.52	558.57	546.05	490.05	4.36	6.26
AVG WEEKLY HOURS, PROD WORKERS, BITUMINOUS COAL & LIGNITE MINING	32.90	47.70	43.20	41.27	13.68	1.81
TAX RECEIPTS, COAL SEVERANCE, CONSOLIDATED, TOTAL	16.90	8.61	14.53	40.03	*	-16.11
CONSTRUCTION (MILLIONS OF $, NO. OF PRIVATE RESID. UNITS--NOT SEAS ADJ)						
VALUE OF CONSTRUCTION CONTRACTS, RESIDENTIAL & NON-RES	130.90	125.70	200.80	457.40	11.29	17.22
PERMIT AUTHORIZED CONSTRUCTION, NO. OF 1-FAMILY RESID. UNITS	551.00	356.00	442.00	1349.00	27.02	-10.42
VALUE OF PERMIT AUTHORIZED CONSTRUCTION, 1-FAMILY RESID. UNITS	24.63	15.91	21.36	61.91	31.74	0.67
PERMIT AUTHORIZED CONSTRUCTION, NO. OF RESID. UNITS, TOTAL	836.00	957.00	606.00	2399.00	34.47	-15.80
VALUE OF PERMIT AUTHORIZED CONSTRUCTION, ALL RESID. UNITS, TOTAL	32.06	32.75	25.02	89.83	43.98	-0.03
RETAIL SALES (MIL $, 000 CARS)						
TAX RECEIPTS, GENERAL FUND, SALES AND GROSS RECEIPTS	54.40	64.31	66.30	185.00	*	5.28
NEW PASSENGER CAR REGISTRATIONS, TOTAL, NOT SEAS. ADJ.	7.79	8.36	6.90	23.04	*	36.54
FINANCE AND INSURANCE (MILLIONS OF DOLLARS)						
NET LOANS MADE & ACQUIRED BY KY. SAVINGS & LOAN ASSOCIATIONS	41.42	38.91	41.09	121.42	45.10	105.03
SALES OF ORDINARY LIFE INSURANCE	457.49	390.32	460.93	1308.74	6.68	11.27
SELECTED STATE GOVERNMENT RECEIPTS (MIL $)						
TAX AND NONTAX RECEIPTS, GENERAL FUND, TOTAL	151.77	163.31	160.19	475.27	*	4.53
TAX RECEIPTS, GENERAL FUND, SALES & USE TAXES, TOTAL	50.92	55.50	54.05	160.46	*	6.44
TAX RECEIPTS, GENERAL FUND, INCOME TAX, INDIVIDUAL	41.47	71.37	45.30	158.14	*	33.93
TAX RECEIPTS, GENERAL FUND, INCOME TAX, CORPORATION	15.52	4.29	40.20	60.00	*	-11.17
TAX RECEIPTS, STATE ROAD FUND, STATE SHARE	24.96	39.90	53.90	118.76	*	40.11
TAX RECEIPTS, STATE ROAD FUND, MOTOR FUELS NORMAL, USE & SURTAX	7.16	24.22	14.93	46.31	*	2.29
TAX RECEIPTS, STATE ROAD FUND, MOTOR VEHICLE USAGE TAX	8.42	9.28	7.85	25.55	*	9.96

PRIVATE SOURCES FOR THE ABOVE DATA INCLUDE:
F. W. DODGE DIVISION (MCGRAW-HILL INFORMATION SYSTEMS COMPANY), VALUE OF CONSTRUCTION CONTRACTS;
LIFE INSURANCE MARKETING & RESEARCH ASSOCIATION, SALES OF ORDINARY LIFE INSURANCE;
R. L. POLK & COMPANY, NEW CAR REGISTRATIONS

* = QUARTER TO QUARTER COMPARISONS NOT MEANINGFUL DUE TO SEASONAL VARIATION

(continued from page 7)

TABLE 2

KENTUCKY DEPARTMENT OF REVENUE JULY 1981 AND PRIOR FORECASTS FOR 1981-82 TRANSPORTATION FUND REVENUES
(Millions of Dollars)

Tax	March 1980 Estimates for 1981-82	January 1981 Estimates for 1981-82	July 1981 Estimates for 1981-82	Actual 1980-81 Collections	Implied Growth Rate for 1981-82 (Percent)
Motor Fuels Normal[1]	$235.00	$186.00	$186.00	$172.54	7.8%
Motor Fuels Use[1]	11.20	8.50	6.50	6.15	5.7
Motor Vehicle Usage[2]	129.25	110.40	104.10	88.25	18.0
Passenger Car License	20.20	20.00	20.00	19.70	1.5
Coal Severance	43.75	42.75	42.75	42.28	1.1
Subtotal	439.40	367.65	359.35	328.92	9.2
Other Transportation Fund Tax Receipts	32.03	31.35	31.05	31.98	(2.9)
Total Tax Receipts	$471.43	$399.00	$389.92	$360.90	8.0
Plus, Departmental Fees, Sales, and Rentals	NA	NA	.48	.46	4.7
Total Tax Receipts, Departmental Fees, Sales, and Rentals	NA	NA	$390.40	$361.36	8.0

[1] Does not include motor fuels surtaxes.
[2] Excludes motor vehicle rental use taxes.

Fund. Again however, given the current economic climate, the downside risk is more probable than the upside risk. If interest rates remain high and automobile sales do not improve at the estimated 8 percent growth rate, a 2 percent or greater error is possible. As with our forecast for the General Fund, we will monitor receipts into the Transportation Fund throughout the year and will be prepared to revise our estimates, should the situation warrant this.

Notes

[1] If these income tax refunds are subtracted from fiscal 1980-81 receipts, total revenue for the General Fund is actually 1.8 percent less than the January 1981 estimate, and the General Fund can be considered to have grown by 5.3 percent in fiscal 1980-81. Most 1979 income tax refunds were paid within fiscal 1979-80 but there is historical precedent for holding refunds owed in one fiscal year over for payment in the following fiscal year.

[2] A more detailed discussion of our forecast for each of these individual taxes is included in the document prepared by the Kentucky Department of Revenue entitled, "The Kentucky Revenue Forecast," presented to the legislature's Appropriations and Revenue Committee, July 23, 1981.

The Shortfall in Kentucky Tax Revenues

by Lawrence K. Lynch*

Tax revenues grew very slowly in Kentucky in fiscal year 1980-81, well below the author's estimate made during the 1980 session of the Kentucky General Assembly and reported in the June 1980 issue of *Kentucky Economy: Review & Perspective.* They were significantly below the July 1980 revised estimate reported by the author in the September 1980 issue of this publication. The actual 1980-81 receipts, as well as 1979-80 receipts, are shown in the accompanying table.

The shortfall in tax receipts necessitated severe budget cuts during fiscal 1980-81. An even larger anticipated shortfall in 1981-82, as compared to the amounts budgeted during the 1980 legislative session, has forced several rounds of even more stringent budget cuts for the current fiscal year: $185 million of the 1981-82 budget was trimmed in January 1981; $100.6 million more was squeezed out in July 1981.

The July 1981 cuts were based upon Kentucky Department of Revenue revised revenue estimates for 1981-82. The author, at the request of the Legislative Research Commission (LRC), has made independent revised revenue estimates and they are more optimistic than the Department of Revenue's. A description of the LRC estimates follows.

The author's estimates were made using the revenue elasticity model described previously in this publication.[1] In essence, the model statistically estimates relationships between changes in tax revenues and changes in personal income, an overall measure of Kentucky's economic progress. A forecast of the

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change in personal income is obtained from the Kentucky econometric model, and then the revenue elasticity model is applied to generate the revenue estimates.

For the July 1981 revised revenue estimates, the economic assumptions were the May 26, 1981 forecasts of the Kentucky econometric model: personal income growth of 9.49 percent for 1981 and 13.33 percent for 1982; total nonagricultural wage and salary employment growth of -0.04 percent in 1981 and 4.69 percent in 1982; and an average unemployment rate of 7.6 percent in 1981 and 6.5 percent in 1982.[2] Thus the 1981-82 period is expected to be one of modest economic growth with no recession. The inflation rate is expected to decline to about 8 percent for the fiscal year.

The author's revised revenue estimates for 1981-82 are reported in the accompanying table. The General Fund is expected to grow by 9.7 percent, significantly more than in 1980-81, but still a very low growth rate by historical standards. The Transportation Fund, which actually declined in 1980-81, is expected to grow, but very modestly, in 1981-82.

The author's revised General Fund estimates are considerably higher than the Department of Revenue estimates, described in the preceding article. In their article, Gardner and Thalheimer posit that the Kentucky tax base is becoming less responsive to economic growth. The author believes, however, that if anything, the tax base is becoming more responsive to economic growth. Thus receipts will tend in the future to be more volatile, growing sharply in good years and stagnating in recession years. This view is supported by Stephen Lile, in his article, "The Effect of Tax Revision on Revenue Adequacy in Kentucky."[3]

The conflicting forecasts of state government tax revenue have important implications for tax policy. If the author's estimates are realized, there is a much weaker case for a major tax increase than if the Department of Revenue's estimates are realized. Fortunately, receipts for half of the fiscal year will already have been counted when the General Assembly meets in January 1982, providing a good indication of which forecast for the full fiscal year is more accurate.

Notes

[1] Lawrence K. Lynch, "The Outlook for Kentucky Tax Revenues," *Kentucky Economy: Review & Perspective*, Vol. 4, No. 2, June 1980, pp. 10-11.

[2] Charles G. Renfro and Paul A. Coomes, "Kentucky Econometric Model Forecast," *Kentucky Economy: Review & Perspective*, Vol. 5, No. 2, June 1981, p. 3.

[3] Stephen E. Lile, "The Effect of Tax Revision on Revenue Adequacy in Kentucky," *Kentucky Economy: Review & Perspective*, Vol. 5, No. 2, June 1981, pp. 8-10.

KENTUCKY STATE GOVERNMENT TAX RECEIPTS
ACTUAL, FISCAL YEARS 1979-80 AND 1980-81
LYNCH ESTIMATES, FISCAL YEAR 1981-82
(Millions of Dollars)

	Actual Receipts			July 1981 Revised Estimate	
Tax Source	FY 1979-80	FY 1980-81	Percent Change	FY 1981-82	Percent Change
Sales and Use	607.3	630.2	3.8	684.8	8.7
Individual Income	505.8	573.1[1]	13.3	636.8	11.1
Corporation Income	158.5	154.8	-2.3	174.8	12.9
Coal Severance	176.4	178.8	1.4	198.1	10.8
Less Transfer	(32.6)	(42.3)	–	(42.7)	–
Other General Fund	366.6	400.3	9.2	427.4	6.8
Total General Fund	1,782.0	1,894.9	6.3	2,079.2	9.7
Motor Fuels[2]	187.1	180.5	-3.5	189.5	5.0
Motor Vehicle Usage[3]	97.1	91.3	-6.0	103.1	12.9
Coal Severance Transfer[4]	32.6	42.3	–	42.7	–
Other Transportation Fund Tax Receipts	46.0	46.2	0.4	48.5	5.0
Total Tax Receipts, State Road Fund	362.8	360.3	-0.7	383.8	6.5

[1] Actual receipts include $19.0 million in unpaid refunds which must be paid out of FY 1981-82 receipts.
[2] This item includes Motor Fuels Normal, Use and Surtaxes.
[3] This item includes Motor Vehicle Rental Use taxes.
[4] This item is based upon existing bond issues only, and reflects a reduction for earned income.

SOURCE: The source for the actual FY 1979-80 and FY 1980-81 receipts: Kentucky Department of Revenue, *Kentucky State Government Revenue*, Vol. 23, No. 12, 2 pp.

Kentucky's Role in International Trade and Investment

by Cary W. Blankenship*

United States citizens have traditionally paid little attention to international trade and investment. This is rapidly changing however, especially among American business and government groups. In the 1970s, and now in the 1980s, such problems as the rise in the price of oil by the Organization of Petroleum Exporting Countries (OPEC) and the increased volume of Japanese exports flooding the American automobile market, have focused the attention of Americans on the importance of U.S. export sales and foreign investment in the United States.

Kentucky has not been isolated from these developments. In recent years a strong emphasis has been placed upon developing export markets for Kentucky-produced goods and upon increasing the level of foreign investment in Kentucky. Both areas are seen as vital for the maintenance of economic growth in the state. The following article reviews these developments, using data from surveys conducted by the Kentucky Department of Commerce during 1980. The investment figures given are approximate and reflect survey responses by foreign firms in Kentucky. The trade figures are based upon published data.

At the present time, foreign investment in Kentucky represents approximately $600 million. Forty-five percent of this investment is in the traditional Kentucky industries of bourbon and cigarette production. Other industries in Kentucky having foreign investment include chemicals, fabricated machinery and parts, and raw materials. The national origin of foreign investment in Kentucky is shown in Table 1. These figures reveal the close ties which have traditionally existed between Kentucky and Northern European countries. Eighty-seven percent of Kentucky's foreign investment comes from Northern Europe. The low level of Japanese investment in Kentucky compared with European investment can be attributed to traditionally weak cultural and business ties between Japan and Kentucky. However, there is a significant level of Japanese investment in neighboring states such as Tennessee and Ohio, as well as in Georgia. This suggests that there are some negative factors working against Japanese investment in Kentucky. High workmen's compensation rates, the presence of strong unions, and the lack of state incentives for foreign investment are often cited to illustrate the disincentives.

Louisville has the highest level of foreign capital in Kentucky with more than 50 percent of the state's reported foreign investment. In addition, there are ten thousand jobs in Kentucky associated with foreign investment and approximately 45 percent of these are in Louisville. The second largest amount of foreign capital, 17 percent, is in Western Kentucky. Central Kentucky has 12 percent, Eastern Kentucky 11 percent, and Northern Kentucky 9 percent.

Foreign investment in Kentucky seems to be following national trends, as for example, in the greater interest by foreign firms for investment in medium or small sized American companies. Twenty-nine of the thirty-five foreign firms in Kentucky employ fewer than three hundred people. Specific Kentucky examples of the trend by foreign firms toward acquisition rather than new construction are the recent purchases of Firestone Wire and Cable Co. in Danville by a Japanese consortium, the Carborundum Facility in Hickman by Sigri Electrographite of West Germany, and Austin Nichols Distilling Co. in Lawrenceburg by Pernod Ricard of France. In addition, foreign interest in Kentucky's natural resources such as coal, timber, and other minerals should bring new foreign participation to the state's economy.

TABLE 1

NATIONAL ORIGIN OF FOREIGN INVESTMENT IN KENTUCKY

Country	Percent of Total Foreign Investment in Kentucky
England	43
West Germany	25
France	14
Canada	12
Sweden	5
Japan	1
Total	100

Foreign investment in Kentucky is the more noticeable of Kentucky's international activities because of such things as ownership of buildings and equipment. However, foreign sales of Kentucky products play an equally important role for the state's economy. Trade figures from the U.S. Department of Commerce show export sales of manufactured Kentucky products at $1.137 billion in 1976.[1] Estimates of Kentucky export sales of manufactured products in 1980 are over $2 billion. The largest export sector is transportation equipment, with Kentucky ranking fourteenth nationally in this type of export. The second and third largest sectors are nonelectrical machinery and chemicals, respectively.

The patterns of Kentucky's export sales markets are similar to the patterns of foreign investment. More than 60 percent of the dollar value of Kentucky's exports come from European countries and Canada. The South American market, representing 20 percent of Kentucky sales and Asia, with 10 percent of the sales, seem to be growing in importance however.

More than five hundred of Kentucky manufacturers report export sales and this represents approximately 18 percent of all Kentucky manufacturers. Nationally the percentage of

**When he wrote this article in May 1981, Cary W. Blankenship was Deputy Director of the Kentucky Commerce Cabinet's European Economic Development Office, Brussels, Belgium. That office has since closed and Mr. Blankenship has returned to Louisville, Kentucky as project manager with the export management firm, the Summit Co.*

exporting manufacturers is only 7 percent. It is important to note that among Kentucky exporting companies, more than 45 percent employ fewer than three hundred people and 17 percent have fewer than one hundred employees. The active participation by Kentucky's industry in overseas marketing accounts for the large proportion of employment that is related to export sales in relatively small firms. Over 24,500 jobs in Kentucky are either directly or indirectly tied to exports and more than $15 million of annual state and local taxes are generated through export sales.

Kentucky's agricultural exports have grown rapidly in the past decade. The 1980 value of agricultural exports exceeded $500 million. The three major export crops are soybeans, corn, and tobacco; the principal markets are Europe, Asia, and South America. The recent increase in coal exports from the United States to Europe has opened up new markets for the Kentucky coal industry. However, transportation problems have retarded this growth when compared to that experienced by states located closer to coastal ports.

The Kentucky international service sector is also growing, though it still is quite small when compared with either foreign investment or export sales. This sector consists of freight forwarding firms, international banking, trading companies, and legal services. Together this sector employs approximately one thousand Kentuckians. The expansion of the international service sector in Kentucky is vitally important for future recruitment of foreign investment and for expansion of export sales of Kentucky products.

Note

[1]Office of International Economic Research, Industry and Trade Administration, U.S. Department of Commerce, *Kentucky Exports*, November 1978.

Bonded Indebtedness in Kentucky: A Review

by Richard E. Gift*

The bonded indebtedness of state and local government in Kentucky has grown enormously since the early 1950s. Throughout much of this period the economic and legal problems associated with this growth received very little attention in scholarly, governmental, and journalistic circles. Several studies were undertaken at the University of Kentucky in the early and middle 1960s by Martin, Porter, and Lynch,[1] but after that time there does not appear to have been any systematic investigation of these problems until the late 1970s.

The recent renewal of research activity has resulted in the publication of several reports dealing with the debts of the Commonwealth and, to a lesser extent, of local governmental units in Kentucky.[2] The most current of these is a monograph entitled *Bonded Indebtedness in Kentucky*.[3] It is the product of a study begun in 1979 by the staff of the Kentucky Legislative Research Commission (LRC) on behalf of the legislature's Committee for Program Review and Investigation. The remarks which follow summarize this document and comment on its strengths, weaknesses, and limitations.

The monograph presents a comprehensive statistical review of state and local debt as of June 30, 1980, including a careful analysis of the degree to which the state's debt service is an actual drain on its own tax and nontax revenues. With this as a foundation, the study proceeds to the question of the real economic burdens of the debt, with special attention to the state's ability to service its bonds without future budgetary disruptions or adverse credit rating adjustments; a number of comparisons with other states are made. All this leads the authors to the conclusion that the present debt burden in Kentucky is within the limits of reasonable safety.

Considerable attention is then given to the problems of administrative efficiency and competency in debt management. A number of specific proposals are made, and these fall into two groups: (1) those having to do with centralizing and streamlining debt management authority with the aim of better planning, coordination, audit, and review; and (2) those having to do with eliminating a rigid and archaic constitutional restriction which causes the state to use high-interest project-revenue bonds in cases where the cheaper general obligation bonds are more appropriate anyway. In addition, a number of mechanisms for meaningful debt limitation are explored, although none is recommended. The paper includes an appendix on the techniques and administrative costs of issuing bonds. This has special value in view of recent discussions in the press concerning the efficiency of these procedures.

This study is definitely a step forward—a positive contribution to the literature on this problem. It is clear, well organized, and accurate. The research is competent, and the organization and writing show careful attention to logic and fact.[4] It is "must" reading for the well-informed Kentucky voter, and it is a valuable reference work for lawmakers, economists, and investors.

For the most part, the monograph is forthright—honestly facing problems that have not been popular items for open discussion, especially those having to do with the costly legalistic fictions that have been used to circumvent the constitution. Furthermore, the writers have suggested creative and innovative remedies for stubborn problems. The quality of their recommendations on the administration of debt management is high.

There are, however, several important points touched upon in this study which need greater emphasis and clarity. For example, the discussion of debt management is detached from, rather than integrated with, the discussion of capital planning, even though it is clear from the study as a whole that these are properly part of a unified planning process. Furthermore, if the connection between these were more explicitly developed, the rather skimpy and overly simple passages on the rationale

(continued on the following page)

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(continued from the preceding page)

for debt financing would have had a better foundation and could have been expanded into a coherent statement of a decision rule on debt financing (versus pay-as-you-go). Similarly, the vague references to something called "improper use of debt" could be given an exact interpretation.

One reason that clarity is needed on this matter is that the state's economic benefit from some capital projects obviously affects the revenue flow in income taxes and the like, rather than in project user fees. This means that the overall adequacy and stability of tax revenues are crucial; hence, questions arise concerning the appropriate limit for all debt. Unfortunately the LRC study does not show how its theoretical treatment of debt limitation could be used to interpret the difficulties experienced by those states with aggravated debt service problems.

This same type of difficulty arises again when some possible debt limitation rules and procedures are considered. The reluctance of the writers to recommend a formula is understandable and probably appropriate, but it is disappointing that the arguments for the various proposals are not fully developed. The effect of this is that the reader cannot tell what the writers believe to be the relative merits of the various possibilities. The development of trade-off criteria is also absent when the question of assigning members of the legislature to the bond issuing commissions is discussed.

In spite of these conceptual problems, the statistical analysis in this document is careful and explicit, and is probably the best presentation of this kind that has been developed to date. It should be mentioned that Kentucky still does not have, or at least does not publish, a comprehensive debt-service flow-of-funds chart. This ought to be an important agenda item in any reform of debt management and capital planning. One of its several benefits would be to encourage and better enable authorities to integrate thinking about debt and capital with thinking about the perennial question of how the state should manage its idle cash balances.

It would have been helpful had the report presented a bibliography of the literature on Kentucky public debt. Likewise, it would have been useful to have a summary and expansion of the information presented in the Department of Finance's annual *Financial Report* concerning public access to the debt management authorities and their records, including the location of the bond contracts.

In closing, it needs to be stated that some of the economic aspects of the debt versus pay-as-you-go financing questions are not discussed at all. *Bonded Indebtedness in Kentucky* shares with most of the studies which have gone before it a deliberate, self-imposed limitation, which is that attention is narrowly focused on debt as an aspect of financial health or soundness. Clearly, any useful research involves restricting the number of questions that are asked; but at the same time, the usefulness of the results depends on being able to place them in a broader context.

Specifically, whenever state and local debt grows, the tax base for every level of government is distorted because tax-exempt income grows and property is usually removed from the tax rolls. Whenever these distortions are used deliberately to encourage industry and commerce of particular types, then the revenue and resource allocation distortions are properly part of the project analysis itself. It is entirely possible that subsidies hidden in debt-financed development would not pass on the question of merit if these bond issues were subjected to traditional fiscal scrutiny, with full attention to distortions. Projects escape this scrutiny when they do not involve a direct drain on tax revenues. Research that focuses on the direct drains on revenue and direct budget conflicts misses the effects that this use of state debt has on the total budgetary process. It is for this reason that high quality debt management cannot be considered in terms of fiscal capacity alone; the debt review process must be conceived of as part of the overall review of the influence of government on the structure and quality of the economic system.

Notes

[1] See especially James W. Martin, "Administrative Action for Efficient Debt Management: The Kentucky Case," *Kentucky Law Journal*, XLIX (Summer 1961), pp. 506-518; Robert Porter, *Factors Influencing the Cost of State and Local Borrowing in Kentucky* (Lexington, Ky.: Bureau of Business Research, University of Kentucky, 1965); and Daniel W. Lynch, *The Development of State and Local Debt in Kentucky: 1890-1961* (Lexington, Ky.: Bureau of Business Research, University of Kentucky, 1966).

[2] Among these were two papers published by the KCEA: Richard E. Gift, "The Kentucky State Debt," *Kentucky Council of Economic Advisors Policy Papers Series*, No. 7 (Lexington, Ky.: Center for Applied Economic Research, University of Kentucky, September 1978) and Richard E. Gift, "Toward a Debt Policy for Kentucky," *Kentucky Council of Economic Advisors Policy Papers Series*, No. 8 (Lexington, Ky.: Center for Applied Economic Research, University of Kentucky, May 1979).

[3] Robert Scheffel Wright, John H. Downard, Tanya Gritz, Larry G. Pitman, and Richard Sims, *Bonded Indebtedness in Kentucky* (Frankfort, Ky.: Legislative Research Commission, Research Report No. 180, April 1981).

[4] The trivia buff will want to question the statement that the Department of Fish and Wildlife has never issued bonds. This may be true as far as administration is concerned (to establish this would require a search in Archives), but the state did have bonds issued in a small amount (less than one million dollars) for fish and wildlife refuge during the 1950s and 1960s. See Daniel W. Lynch, *Kentucky's Debt—Something to Think About* (Lexington, Ky.: Bureau of Business Research, University of Kentucky, 1963), p. 18.

PER CAPITA PERSONAL INCOME

	1979 Revised	1980 Preliminary	Percent Change 1979-80	1980 Rank in U.S.
United States	$8,637	$9,521	10.2	
Southeast Region	7,348	8,111	10.4	
Alabama	6,819	7,488	9.8	47
Arkansas	6,756	7,268	7.6	48
Florida	8,053	8,996	11.7	29
Georgia	7,309	8,073	10.5	36
KENTUCKY	7,052	7,613	8.0	46
Louisiana	7,491	8,458	12.9	35
Mississippi	6,070	6,580	8.4	50
North Carolina	7,110	7,819	10.0	41
South Carolina	6,577	7,266	10.5	49
Tennessee	7,084	7,720	9.0	44
Virginia	8,447	9,392	11.2	22
West Virginia	7,191	7,800	8.5	43

Per capita personal income equals total personal income divided by total population.

SOURCE: United States Department of Commerce, Bureau of Economic Analysis, *NEWS*, BEA 81-45, August 9, 1981.

THE KENTUCKY ECONOMIC INFORMATION SYSTEM (KEIS): A SELECTED BIBLIOGRAPHY*

Publications by Charles G. Renfro

"KEIS/ORACLE: The Kentucky Economic Information System/Online Retrieval and Computational Language for Economists" in *Statistical Software: A Comparative Review for Users and Distributors.* eds. Ivor Francis and Lawrence Wood. New York: Elsevier-North Holland, 1981. Forthcoming.

"The Design of an Information System for State and Local Government Planning and Analysis" in the *Proceedings of the Eighth European Urban Data Management Symposium, Oslo, June 2-5, 1981.* Oslo, Norway: Norwegian Ministry of the Environment, June 1981, pp. G 1/5-1 to G 1/5-11.

"MODLER: The Modeling Language for Econometric Research," *Kentucky Economy: Review & Perspective.* Vol. 5, No. 1, March 1981, pp. 10-14.

"An Online Information System for Aggregate State and Local Area Economic Data," *Journal of the American Society for Information Science.* Vol. 31, No. 5, September 1980, pp. 319-333.

"Economic Data Base Systems: Some Reflections on the State of the Art," *Review of Public Data Use.* Vol. 8, No. 2, August 1980, pp. 121-139.

"Reflections on a Theme By Mendelssohn: The LABSTAT Data Base System" in *Readings in Business and Economic Research Management: Execution and Enterprise.* Vol. I, ed. Jayne D. Fischer. Madison, Wisconsin: Office of Research Administration, School of Business, University of Wisconsin-Madison, 1980, pp. 86-90. A publication of the Association for University Business and Economic Research (AUBER).

"On the Development of a Comprehensive Public Data Base for Aggregate State and Local Economic Data," *Review of Public Data Use.* Vol. 7, No. 5/6, December 1979, pp. 1-10.

"The Kentucky Economic Information System," *Kentucky Economy: Review & Perspective.* Vol. 1, No. 2, May 1977, pp. 2, 7-8.

Publications by Charles G. Renfro with Paul A. Coomes

"The Kentucky Economic Information System" in C. A. Chapman, C. L. Infanger, L. W. Robbins, and D. L. Debertine (eds.), *Taking Computers to the Community: Prospects and Perspectives.* Lexington, Kentucky: University of Kentucky, College of Agriculture Cooperative Extension Service, 1978, pp. 201-208.

The Kentucky Economic Information System User Manual. Lexington, Kentucky: Office for Research, College of Business and Economics, University of Kentucky, 1977. 480 pages.

Publications by Margaret O. Adams

"Online Numeric Database Systems: A Resource for the Traditional Library," *Data Libraries for the Social Sciences,* ed. Kathleen M. Heim. *Library Trends* 31 (Winter 1982). Forthcoming.

"The Kentucky Economic Information System: A Resource for Government, Academic, and Private Sector Researchers and Libraries," *National Online Meeting Proceedings–1981.* New York, March 24-26, 1981. Compiled by Martha E. Williams and Thomas H. Hogan. Medford, New Jersey: Learned Information, Inc. 1981, pp. 7-14.

"An Information System for State and Local Government Planning and Analysis: The Example of the Kentucky Economic Information System," *Center for Applied Economic Research Economic Studies Series.* No. 2. Lexington, Kentucky: Office for Research, College of Business and Economics, University of Kentucky, 1980. 14 pages.

Presentations by Charles G. Renfro at Professional Meetings (not otherwise published)

"The Design of an Econometric Modeling Language: The MODLER Software Package," at the 3rd Annual Meeting of the Society for Economic Dynamics and Control, Copenhagen, Denmark, June 22-24, 1981.

"On the Public Use of an Economic Data Base System," at the Joint Conference on Easier and More Productive Use of Computing Systems of the 3rd International Conference on Data Bases in the Humanities and Social Sciences. This meeting was co-sponsored by the Association for Computing Machinery's Special Interest Group on the Social and Behavioral Science of Computing (SIGSOC) and the Inter-University Consortium for Political and Social Research (ICPSR), Ann Arbor, Michigan, May 20-22, 1981.

"The Kentucky Economic Information System," at the 31st Annual Meeting of the Association for University Business and Economic Research, Little Rock, Arkansas, October 1977.

(With Paul A. Coomes) "The Kentucky Economic Information System," at the 3rd Annual Meeting of the Kentucky Economic Association, Louisville, Kentucky, September 30, 1977.

*A full bibliography of publications related to the Kentucky Economic Information System is available upon request from the KCEA office.

(continued from page 2)

In June 1981, Frances E. Ross, a native of Louisville and a graduate of Bellarmine College, joined the KCEA staff as a Data Analyst. Ms. Ross has previously served as Management Information System coordinator for Hunter Health Plan, Inc., and she has held a variety of other positions. Her primary responsibilities will relate to continuing development of the database of the KEIS and will also include work on special projects undertaken by the Center. We are pleased to have her on our staff.

* * *

Dr. Charles W. Hultman, Chairman of the Kentucky Council of Economic Advisors, appeared with Dr. Grady Stumbo, Secretary of the Kentucky Department for Human Resources, John Clarke of General Electric, Louisville, and Scotty Smith of the AFL-CIO on a panel examining health care cost maintenance in Kentucky. This meeting was in Louisville on August 27, 1981.

* * *

During the summer months, we have expanded significantly the volume of data series available on the Frankfort version of the Kentucky Economic Information System (KEIS). Series newly available include historic data on Kentucky tax revenues (104 monthly, quarterly, and annual series); the annual tax revenue data are available both for calendar and fiscal years. Other new data relate to Kentucky vital statistics: population disaggregated by age, sex, and race, for 1970-79 (125 annual series); these data were originally estimated at the Urban Studies Center, University of Louisville. Users of the KEIS/Frankfort who have not recently obtained an index(es) to the database are urged to do so, in order to have current reference to the available data.

The Bureau of Economic Analysis, U.S. Department of Commerce, has just released revised (1969-80) state-level disaggregated personal income estimates (approximately 300 data series). We expect that these new data for Kentucky will be incorporated into the KEIS annual databank by the middle of October. A capsule view of the per capita personal income for the U.S. and the southeastern states for 1979 and 1980, can be found in the box at the bottom of page 14 of this publication.

For information about the KEIS or to schedule a KEIS training session, please call the KEIS Manager (606-258-4626).

* * *

The October 1981 issue of *Growth and Change: A Journal of Regional Development* contains some articles of probable interest to our readers. These include "An I-O Study of the Economic Structure of Appalachian Kentucky," by Angelos Pagoulatos and Kurt R. Anschel and "Rural Manufacturing Plant Characteristics and the Probability of Plant Closings," by Robert Anderson and David L. Barkley. Single copies and subscriptions to *Growth and Change* are available from the Associate Editor, 644 Maxwelton Court, Lexington, Kentucky 40506.

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